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Spanish morpho-syntax: A lexical categorical approach

Escribano-Díaz, Rafael A., Ph.D.

University of Washington, 1990

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Spanish morpho-syntax:
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by

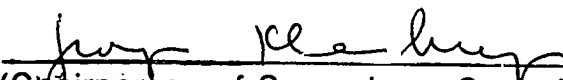
Rafael Escribano-Díaz

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of the requirements for the degree of

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Abstract

Spanish Morpho-syntax: a lexical categorical approach

by Rafael Escribano-Díaz

Chairman of the Supervisory Committee:
Professor Jurgen Klausenburger
Department of Romance Languages

In this dissertation I develop a linguistic mathematical model for a proper subset of the basic morpho-syntax of Spanish using the lexical-categorical approach originally developed by Professor Michael Brame . This approach considers prime and composite morphemes to be objects that are dynamic and charged, as functors with information about themselves and about that part of themselves constituted by their arguments.

In particular I show how it is possible within this theoretical framework, through the operation of lexical composition, to generate --respecting the integrity of lexical items and without transformations of any kind-- a legion of complex grammatical constructions: from the internal morphology of determiners, nouns, and verbs to verbal clitics (without clitic climbing), super/subordinate verb tense and mood agreement, questions (without wh-movement), and question-answer agreement.

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PREFACE

In this dissertation I attempt to model a proper subset of the basic morpho-syntax of Spanish using the lexical-categorical approach as developed by Michael Brame in his *Recursive Categorical syntax and morphology* three part series (See bibliographhy.) and in his courses at the University of Washington from 1987 to 1990. This approach considers words to be objects that are dynamic and charged, as functors with information about themselves and particularly about that part of themselves constituted by their arguments.

Someone generally recognized as a precursor of the lexical composition mechanism used in this dissertation is Kazimierz Ajdukiewicz, a philosopher by training, who together with Tarsky, Lukasiewicz, and Lesniewski --just to mention those better known in the West-- formed part of what has been called the pre-WWII Warsaw Circle of formal logicians (Kotarbinsky 1967). In his classical 1934 article *Die syntaktische Konexität*, Ajdukiewicz sets out to specify "the conditions under which a word pattern, constituted of meaningful words, forms an expression which itself has a unified meaning (constituted, to be sure, by the meaning of the single words belonging to it). A word pattern of this kind is *syntactically connected*." (Ajdukiewicz 1964:206)

Ajdukiewicz recognizes at least two basic categories in natural language: nouns (n) and sentences (s). Every other category, at least in his examples, he elegantly derives as composites of n and s. For example:

*The version of Brame's theory actually used in this dissertation will soon appear in book form as *Introduction to formal linguistics*.

The	lilac	smells	very	strongly	and	the	rose	blooms.
n/n	n	s/n	s/n	s/n	s/ss	n/n	n	s/n
			s/n	s/n				
			s/n					
			s/n					,

where, the n's, s's, and fractions formed thereof appearing under a lexical item specify the categories of the lexical item's arguments (in the denominator) and the category of the whole composite expression formed by the lexical item together with the lexical items that constitute its arguments, i.e. the value of the lexical item considered as a functor, (in the numerator). Approximatedly translated into Brame's ordered pair notation *the*, *lilac*, *smells*, *very*, *strongly*, *and*, *the*, *rose*, and *blooms*, together with their categorical specifications, would look like:

(1)

<the,n/n>
 <lilac,n>
 <smells,s/n>
 <very,((s/n)/(s/n))/((s/n)/(s/n))>
 <strongly,(s/n)/(s/n)>
 <and,s/ss>
 <the,n/n>
 <rose,n>
 <blooms,s/n>.

So the product

<the,n/n> <lilac,n>

would be

<the lilac,n>,

since the argument of *the* , which appears in the denominator of its categorical specification coincides with the category of *lilac* , thus yielding *n*, the category in the numerator of *the* as the resulting category.

There is, however, if we look closer, a problem with directionality. The product of fractions is generally considered to be commutative, therefore there's nothing keeping us from alternatively deriving the following ungrammatical product

$\langle \text{lilac}, n \rangle \langle \text{the}, n/n \rangle$

with the following syntactically non-connected result:

$\langle \text{lilac the}, n \rangle$.

To avoid this Ajdukiewicz used a notational order which Polish logicians and mathematicians are well known for and is often referred to as Polish notation, which applied to (1) yields the following re-ordering

(2)

$\langle \text{and}, s/ss \rangle$
 $\langle \text{very}, ((s/n)/(s/n))/((s/n)/(s/n)) \rangle$
 $\langle \text{strongly}, (s/n)/(s/n) \rangle$
 $\langle \text{smells}, s/n \rangle$
 $\langle \text{the}, n/n \rangle$
 $\langle \text{lilac}, n \rangle$
 $\langle \text{blooms}, s/n \rangle$
 $\langle \text{the}, n/n \rangle$
 $\langle \text{rose}, n \rangle$.

Now omitting the first coordinate of each pair

(3)

s/ss
 $((s/n)/(s/n))/((s/n)/(s/n))$
 $(s/n)/(s/n)$
 s/n
 n/n
 n
 s/n
 n/n
 n

and reading (3) from top to bottom we look for the first functor that is immediately followed by its argument(s) --in bold above-- and cancel as in normal multiplication of fractions:

(4)

s/ss
 $(s/n)/(s/n)$
 s/n
 n/n
 n
 s/n
 n/n
 n

Ajdukiewicz calls this the first derivative of (1). Then we repeat the process:

(5)	(6)	(7)	(8)	(9)	(10)
s/ss	s/ss	s/ss	s/ss	s/ss	s
s/n	s/n	s	s	s	
n/n	n	s/n	s/n	s	
n	s/n	n/n	n		
s/n	n/n	n			
n/n	n				
n					

In (10) the algorithm halts, and (10) is called the **final derivative** of (3). An expression is **syntactically well connected** iff its last derivative is either n or s , or one single fraction formed thereof.

In 1958, Joachim Lambek, a mathematician by training, publishes an article developing Ajdukiewicz's method, in which he deals with directionality by using two kinds of division. Still using only the categories n and s (Or in Lambek's terminology, "types" n and s .), he makes the distinction between right division, x/y , and left division, $y \backslash x$. For example, if $x=n$ and $y=s$ then clearly $s/n = n \backslash s$. In both cases, s is the numerator and n the denominator (and therefore the argument of the fraction), however, s/n will become s only when combined with an n on its right, whereas $n \backslash s$ will become s only when combined with an n on its left. This mechanism already resembles the non-commutative exponential notation that I have borrowed from Brame, where $x/y = xy^{-1}$ and $y \backslash x = y^{-1}x$.

Lambek's objective, as Ajdukiewicz's, is to "obtain an effective rule (or algorithm) for distinguishing sentences from nonsentences" (1958:154) but he already sees the possibility of applying these methods not only to propositional logic and natural language, and points out the fact that this system can be applied to different fields from mechanical translation to the grammar of physics.

Lambek, at the time of the article, apparently feels enough pressure from transformational arguments --he quotes Chomsky's *Three models for the description of language* (1956) and *Syntactic Structures* (1957)-- to footnote the following about his own method: "Chomsky [...] believes that such methods can only describe only a small proportion of the sentences of a natural language and that other sentences should be obtained from these by certain transformations." (1958:154)

In 1979, twenty two years after Lambek's article, Michael Brame, a linguist by training, placed the following bets as to the future evolution of linguistic theory at the end of the introduction to *Essays toward realistic syntax* :

"Lest I convey the impression that I consider the approach offered here as anything definitive, let me hasten to emphasize that ideas continue to evolve; as always, there are many alternative ways

of formulating binding, anaphora, and other processes of interest in these papers. Whatever the final outcome of the precise form which the best theory will assume in the future, I am laying odds that it will be a theory which accords with that presented here in at least the following respects.

i. Abstract subjects of PRO (or [e]NP, etc.) along with the accompanying abstract S or S-bar will play no role. Infinitival complements will be analyzed as infinitival complements, i.e. some version of VP-bar.

ii. Transformations in the sense of the standard theory, extended standard theory, or trace theory will play no role. There will come a time when linguists agree that transformations do not exist.

iii. Conditions, constraints, metaconditions, or metaconstraints such as the Specified Subject Condition, Propositional Island Constraint, Opacity Condition, Tensed S Condition, Nominal Island Constraint, Subjacency, A/A Principle, Relativized A/A, Recoverability of Deletion, etc. will play no role. There will come a time when linguists agree that the effects of those conditions follow from more lexically based theories.

iv. Lexical items will not be altered by transformations, nor even by phonological rules. There will come a time when linguists agree that words are not to be abused by case marking rules and other ad hoc processes.

These pronouncements may seem bold at this stage of our understanding, but these are the objectives toward which my own research has been channeled in recent years. Of interest for serious minded syntacticians will be a comparison of alternative theories which do not incorporate transformations, while satisfying the desiderata of (i)-(iv). Perhaps these essays can provide some stimulus towards this end, an interesting and intriguing prospect for the '80s."

By the mid-'80s, Brame had begun to create grammars using mechanisms and methods that intersected with those of Ajdukiewicz and Lambek, without the use of transformations.

In this dissertation, I have used Brame's Lexical Categorical Grammar as presented in his courses since 1988 to show how we can generate --respecting the integrity of lexical items and without transformations of any kind-- complex grammatical constructions

from the internal morphology of determiners, nouns, verbs, etc. to verbal clitics (without clitic climbing), super/subordinate verb tense and mood agreement, questions (without wh-movement), and question-answer agreement.

The naturalness with which the same mechanism of lexical composition used in the first few chapters to generate free morphemes out of bound morphemes is used in the last chapter to generate question-answer discourses is specially suggestive because it takes us from the realm of morphology into a realm where language forces us to think of it as a dialogical process rather than a summation of isolated autonomous sentences. This constitutes, in my opinion, a step forward in Michail Bakhtin's translinguistic project (Todorov,1984:49), in particular, regarding one of his main criticisms of the Saussurean project: "that the word should be understood not only along the axes of its relationship with other words but in the context of its functioning within the dialogic relationships between speaker and listener" (Bennett,1979:77).

A Andrés Díaz Moure,
abuelo, amigo y primer maestro en ese hermético
campo que es la biología sintética de las cosas
mustias, chuperfláuticas y mantecosas, una de cuyas
más jóvenes y menos oblicuas ramas es
la lingüística matemática.

A Antonio Bou,
con quien sigo llorando la muerte de Artaud
con lágrimas rosadas.

A Mike Brame,
que me volvió a enseñar que los números son
nuestros amigos y las palabras nuestras amigas.

A la memoria de Harold Márquez
por prestarme su traje blanco a prueba de hostias
para mi primera comunión.

A los Ganja Farmers:
Danny, Mike, Leo, y Boom.

A Ingrid.

A mí.

x

I INTRODUCTION: GRAMMATICAL CATEGORIES AND THEIR INVERSES

Consider the following nominal paradigm:

(0)

muchachas 'young women'

muchacha 'young woman'

muchachos 'young men'

muchacho 'young man'

We can immediately argue that the morphemes involved are:

muchach, noun stem for 'young person'

a, feminine suffix

o, masculine suffix

s, plural suffix

$\emptyset$, singular suffix.

Let's summarize this information in ordered pair form, where the first coordinate is the orthographic morpheme and the second coordinate is an abbreviation for the grammatical category or set the morpheme belongs to :

(1)

$\langle \text{muchach}, N \rangle$	$\langle a, G_f \rangle$	$\langle s, \#_p \rangle$
	$\langle o, G_m \rangle$	$\langle \emptyset, \#_s \rangle$

and we can further specify these pairs to express the fact that gender morphemes, for example, seek to attach themselves, so to speak, on to the right-hand end of noun stems. We can do this by including a noun category symbol on the left-hand side of the second coordinate of the gender morphemes. We superscribe this noun category symbol with a -1 to express the fact that there's not a noun there but actually the need for one:

(2)

 $\langle a, N^{-1}G_f \rangle$ $\langle o, N^{-1}G_m \rangle$

This notation reflects --in an ordered and directional way-- the affinity between gender suffixes and noun stems. And we can do the same with the rest of the morphemes in (1):

(3)

$\langle muchach, N \rangle$	$\langle a, N^{-1}G_f \rangle$	$\langle s, G_x^{-1}\#_p \rangle$
	$\langle o, N^{-1}G_m \rangle$	$\langle \emptyset, G_x^{-1}\#_s \rangle$

where the subscripted variable x ranges over the set of genders, $\{m, f\}$, masculine and feminine.

Through the following rule we summarize how, given the particular treatment of morphemes we have just presented, affine morphemes can combine to form composite morphemes. The symbols x and y are variables ranging over orthographic morphemes like *muchach*, *a*, *s*, *o*, $\emptyset$ and the symbols $C_1, \dots, C_n$ are variables ranging over grammatical categories:

(4)

Lexical composition rule (LCR):

$$\langle x, C_1 \rangle \odot \langle y, C_1^{-1}C_2 \rangle = \langle xy, C_2 \rangle$$

Now we have the minimally necessary apparatus to derive all four words in paradigm (1). For example, we can derive *muchachas*, as follows:

(5)

1. $\langle muchach, N \rangle \odot \langle a, N^{-1}G_f \rangle \odot \langle s, G_x^{-1}\#_p \rangle$ 2. $\langle muchacha, G_f \rangle \odot \langle s, G_x^{-1}\#_p \rangle$ by LCR on the first two pairs of line 1.

Our Lexical Composition Rule, however, cannot apply to the two ordered pairs in line 2 of the derivation because x , even though

it varies over f and m , is strictly speaking still a variable, different from these constant values, f and m . In order to have the necessary conditions for the application of LCR we need to make the variable x into one of its possible constant values, in this particular case, the value f . Every time we do this we will be applying what can be called a Variable Instantiation Rule (VIR). Now we can continue the derivation of *muchachas*.

(6)

3. $\langle \text{muchacha}, G_i \rangle @ \langle s, G_i^{-1} \#_p \rangle$ by VIR applied to line 2.
4. $\langle \text{muchachas}, \#_p \rangle$ by LCR applied to line 3.

We have succeeded in deriving the word *muchachas* but the grammatical category associated with it in the second coordinate corresponds only to its rightmost morpheme $\langle s, \#_p \rangle$. But, after all, this is what LCR promised: to combine a category with its inverse category while canceling¹ them in the process.

Sometimes, however, --and this is one of those times-- we will need to preserve categorial information that LCR would normally cancel in order to proceed with further derivations. For example, if we wanted to combine a determiner with $\langle \text{muchachas}, \#_p \rangle$, Spanish would require not only agreement in number but also in gender. In that case, a Spanish determiner would also need to know whether it is combining with a noun or with another determiner, since like nouns, determiners in Spanish also have gender and number information. How then do we keep this categorial information from canceling out, given the effects of LCR?:

(7)

$$\langle x, C_1 \rangle @ \langle y, C_1^{-1} C_2 \rangle = \langle xy, C_2 \rangle,$$

i.e., How do we keep category C_1 from getting canceled?

We can preserve category C_1 by specifying it right after its inverse, thus yielding the desired result:

(8)

¹ For the Martian point of view on the spelling "canceling" versus "cancelling", see *Ungrammatical notes 3: Undoubling and the impeccable British* (Brame:1983).

$$\langle x, C_1 \rangle \odot \langle y, C_1^{-1} C_1 C_2 \rangle = \langle xy, C_1 C_2 \rangle.$$

(8) is a general solution to the problem of preserving categories.

We can re-specify the gender and number morphemes using this result:

(9)

$$\begin{array}{lll} \langle \text{muchach}, N \rangle & \langle a, N^{-1} NG_f \rangle & \langle s, G_x^{-1} G_x \#_p \rangle \\ & \langle o, N^{-1} NG_m \rangle & \langle \emptyset, G_x^{-1} G_x \#_s \rangle. \end{array}$$

If we derive *muchachas* again using these specifications, we will be able to preserve all the categorial information we will need for further derivations:

(10)

1. $\langle \text{muchach}, N \rangle \odot \langle a, N^{-1} NG_f \rangle \odot \langle s, G_x^{-1} G_x \#_p \rangle$
2. $\langle \text{muchacha}, NG_f \rangle \odot \langle s, G_x^{-1} G_x \#_p \rangle$ by LRC on the first two pairs of line 1.
3. $\langle \text{muchacha}, NG_f \rangle \odot \langle s, G_f^{-1} G_f \#_p \rangle$ by VIR applied to line 2.

Now we just have to apply LCR to line 3 ... But can we? Well if we compare line 3 with LCR as defined in (3), the correspondences are as follows:

(11)

$$\begin{array}{l} \text{muchacha} = x \\ s = y \\ G_f = C_1 \\ \#_p = C_2 \end{array}$$

but LCR in its present version does not provide for a situation like the one we have in line 3, where we have categories to the left of C_1 in the word on the left, which in this case leaves us with

(12)

$$N = ?.$$

Therefore, the answer is no, we can not apply LCR to line 3. Which means we are going to have to generalize the Lexical Composition Rule so as to allow for categories to the left of C_1 , something like this

$$(13) \quad \langle x, C_1 C_2 \rangle @ \langle y, C_2^{-1} C_3 \rangle = \langle xy, C_1 C_3 \rangle,$$

where C_1 and C_3 can be any two strings of categories whatsoever, including the string just containing the identity category 1, which as expected combines with any category C in the following way: $1C = C1 = C$.

Now we are ready to apply our new Lexical Composition Rule, as defined in (13), to line 3 to obtain

$$(14) \quad 4. \langle \text{muchachas}, NG_i \#_p \rangle, \text{ by LCR applied to line 3.}$$

From now on the acronym LCR will refer to the revised version of LCR as it appears in (13).

We will use the simple mechanism of lexical composition introduced here to model not only the formation of free morphemes out of the composition of bound morphemes but also wider syntactic processes such as determiner-noun agreement, subject-verb agreement, verb-object agreement, clitic-verb agreement, superordinate-subordinate verb agreement, and --beyond the "autonomous" sentence-- question-answer agreement.

II DETERMINERS, NOUNS, AND ADJECTIVES

1. Determiners

What are the intrinsic grammatical categories expressed by a Spanish determiner? Let's take *el* 'the (masc. sg.)', for example. *el* expresses definiteness (it's a definite determiner), person (third), gender (masculine), number (singular). In our ordered pair notation we can summarize this information as follows:

$$(15) \\ \langle el, D_{def}3G_m\#_s \rangle$$

However, there is more to determiners than this. Determiners seem to like hanging around with nouns that agree with them in gender and number and, furthermore, it would be easy to argue that it is determiners that seek nouns and not the other way around. This follows easily from our belief that a grammar should be, all other things being equal, as economical as possible. Let's consider the two possibilities one by one.

First, let's assume that it is nouns that seek determiners. Then a noun like *muchacho* would be liable to seek a determiner like, say, *el*. Assuming the definition of *el* given above, then *muchacho* would have to be defined as follows:

$$(16) \\ \langle muchacho, (D_{def}3G_m\#_s)^{-1}(D_{def}3G_m\#_s)NG_m\#_s \rangle$$

And the whole paradigm of *muchacho* would look like this:

$$(17) \\ \begin{aligned} &\langle muchacha, (D_{def}3G_f\#_s)^{-1}(D_{def}3G_f\#_s)NG_f\#_s \rangle \\ &\langle muchachas, (D_{def}3G_f\#_p)^{-1}(D_{def}3G_f\#_p)NG_f\#_p \rangle \\ &\langle muchacho, (D_{def}3G_m\#_s)^{-1}(D_{def}3G_m\#_s)NG_m\#_s \rangle \\ &\langle muchachos, (D_{def}3G_m\#_p)^{-1}(D_{def}3G_m\#_p)NG_m\#_p \rangle \end{aligned}$$

Now, if we were to specify every Spanish noun as having a determiner as its argument we would have to repeat the category string $(D_{\text{def}}3G_f\#_s)^{-1}(D_{\text{def}}3G_f\#_s)$ dozens of thousands of times, one for every noun.

On the other hand, there are probably no more than a hundred items we would want to call determiners in Spanish. It is definitely more economical to treat these as the ones that seek nouns and not the other way around. This we can do by including in the categorial information of the determiner the noun categories that it seeks:

(18)

$$\langle e/, D_{\text{def}}3G_m\#_s(NG_m\#_s)(NG_m\#_s)^{-1} \rangle.$$

If the determiner is the noun seeker then we only have to repeat the string of categories $(D_{\text{def}}3G_f\#_s)^{-1}(D_{\text{def}}3G_f\#_s)$ less than a hundred times, one for each determiner, in order to get all the determiner-noun sequences of Spanish.

A word like *e/* defined this way, however, forefronts a new limitation of our Lexical Composition Rule even as revised in (13): our rule does not work for words that seek words on their right, i.e., words with their arguments on the right. So we have to either posit a second Lexical Composition Rule for right-handed words, something along the lines of

(19)

$$\langle x, C_1 C_2^{-1} \rangle \odot \langle y, C_2 C_3 \rangle = \langle xy, C_1 C_3 \rangle.$$

or find a way of making our LCR ambidextrous.

Or maybe it is ambidextrous already. Let's see. As we have seen so far, for every category C there is a right-inverse category C^{-1} , i.e., when these are combined through LCR they become the identity category 1 (See what happens to C_2 and C_2^{-1} in the formula above.). So, if the reason for C^{-1} being the right-inverse of C is that the result of their combination is 1, then, by the same reason, C must in turn be the left-inverse of C^{-1} since when they combine the result is, as we have seen, 1. We can summarize this last statement in the following identity:

(20)

Double Inverse Rule² (DIR)

$$C = (C^{-1})^{-1}.$$

We can now easily derive a determiner phrase like *e/ muchacho* :

(21)

$$1. \langle el, D_{def} 3G_m \#_s (NG_m \#_s) (NG_m \#_s)^{-1} \rangle \langle muchacho, NG_m \#_s \rangle$$

If we compare line 1 of this derivation with LCR in (13) we can see that the conditions exist for the application of LCR, let's look at the correspondences:

(22)

$$x = el$$

$$C_1 = D_{def} 3G_m \#_s (NG_m \#_s)$$

$$C_2 = (NG_m \#_s)^{-1}$$

$$y = muchacho$$

$$C_2^{-1} = NG_m \#_s$$

$$C_3 = 1$$

So we can go on with the derivation:

(23)

$$2. \langle el, D_{def} 3G_m \#_s (NG_m \#_s) (NG_m \#_s)^{-1} \rangle \langle muchacho, ((NG_m \#_s)^{-1})^{-1} \rangle$$

by $C = (C^{-1})^{-1}$ applied to line 1.

$$3. \langle el\ muchacho, D_{def} 3G_m \#_s NG_m \#_s \rangle \text{ by LCR applied to line 2.}$$

Here are possible lexical specifications for some of the major determiner classes in Spanish:

Definite:

² The inverse of the inverse of a relation is the relation itself. See Serrano (1977:99) or Wall (1972:110)

$\langle \text{el}, D_{\text{def}} 3G_m \#_s (NG_m \#_s) (NG_m \#_s)^{-1} \rangle$
 $\langle \text{los}, D_{\text{def}} 3G_m \#_p (NG_m \#_p) (NG_m \#_p)^{-1} \rangle$
 $\langle \text{la}, D_{\text{def}} 3G_f \#_s (NG_f \#_s) (NG_f \#_s)^{-1} \rangle$
 $\langle \text{las}, D_{\text{def}} 3G_f \#_p (NG_f \#_p) (NG_f \#_p)^{-1} \rangle$

Indefinite:

$\langle \text{un}, D_{\text{indef}} 3G_m \#_s (NG_m \#_s) (NG_m \#_s)^{-1} \rangle$
 $\langle \text{unos}, D_{\text{indef}} 3G_m \#_p (NG_m \#_p) (NG_m \#_p)^{-1} \rangle$
 $\langle \text{una}, D_{\text{indef}} 3G_f \#_s (NG_f \#_s) (NG_f \#_s)^{-1} \rangle$
 $\langle \text{unas}, D_{\text{indef}} 3G_f \#_p (NG_f \#_p) (NG_f \#_p)^{-1} \rangle$

Demonstrative:

$\langle \text{este}, D_{\text{dem1}} 3G_m \#_s (NG_m \#_s) (NG_m \#_s)^{-1} \rangle$
 $\langle \text{ese}, D_{\text{dem2}} 3G_m \#_s (NG_m \#_s) (NG_m \#_s)^{-1} \rangle$
 $\langle \text{aquel}, D_{\text{dem3}} 3G_m \#_s (NG_m \#_s) (NG_m \#_s)^{-1} \rangle$

$\langle \text{estos}, D_{\text{dem1}} 3G_m \#_p (NG_m \#_p) (NG_m \#_p)^{-1} \rangle$
 $\langle \text{esos}, D_{\text{dem2}} 3G_m \#_p (NG_m \#_p) (NG_m \#_p)^{-1} \rangle$
 $\langle \text{aquellos}, D_{\text{dem3}} 3G_m \#_p (NG_m \#_p) (NG_m \#_p)^{-1} \rangle$

$\langle \text{esta}, D_{\text{dem1}} 3G_f \#_s (NG_f \#_s) (NG_f \#_s)^{-1} \rangle$
 $\langle \text{esa}, D_{\text{dem2}} 3G_f \#_s (NG_f \#_s) (NG_f \#_s)^{-1} \rangle$
 $\langle \text{aquella}, D_{\text{dem3}} 3G_f \#_s (NG_f \#_s) (NG_f \#_s)^{-1} \rangle$

$\langle \text{estas}, D_{\text{dem1}} 3G_f \#_p (NG_f \#_p) (NG_f \#_p)^{-1} \rangle$
 $\langle \text{esas}, D_{\text{dem2}} 3G_f \#_p (NG_f \#_p) (NG_f \#_p)^{-1} \rangle$
 $\langle \text{aquellas}, D_{\text{dem3}} 3G_f \#_p (NG_f \#_p) (NG_f \#_p)^{-1} \rangle$

Possessive

$\langle \text{mi}, D_{\text{poss1ss}} 3G_x \#_s (NG_x \#_s) (NG_x \#_s)^{-1} \rangle$
 $\langle \text{mis}, D_{\text{poss1sp}} 3G_x \#_p (NG_x \#_p) (NG_x \#_p)^{-1} \rangle$
 $\langle \text{tu}, D_{\text{poss2ss}} 3G_x \#_s (NG_x \#_s) (NG_x \#_s)^{-1} \rangle$

$\langle \text{tus}, D_{\text{poss2sp}} 3G_x \#_p (NG_x \#_p) (NG_x \#_p)^{-1} \rangle$
 $\langle \text{su}, D_{\text{poss2/3ss}} 3G_x \#_s (NG_x \#_s) (NG_x \#_s)^{-1} \rangle$
 $\langle \text{sus}, D_{\text{poss2/3sp}} 3G_x \#_p (NG_x \#_p) (NG_x \#_p)^{-1} \rangle$
 $\langle \text{nuestro}, D_{\text{poss1ps}} 3G_m \#_s (NG_m \#_s) (NG_m \#_s)^{-1} \rangle$
 $\langle \text{nuestros}, D_{\text{poss1pp}} 3G_m \#_p (NG_m \#_p) (NG_m \#_p)^{-1} \rangle$
 $\langle \text{vuestro}, D_{\text{poss2ps}} 3G_m \#_s (NG_m \#_s) (NG_m \#_s)^{-1} \rangle$
 $\langle \text{vuestros}, D_{\text{poss2pp}} 3G_m \#_p (NG_m \#_p) (NG_m \#_p)^{-1} \rangle$
 $\langle \text{nuestra}, D_{\text{poss1ps}} 3G_f \#_s (NG_f \#_s) (NG_f \#_s)^{-1} \rangle$
 $\langle \text{nuestras}, D_{\text{poss1pp}} 3G_f \#_p (NG_f \#_p) (NG_f \#_p)^{-1} \rangle$
 $\langle \text{vuestra}, D_{\text{poss2ps}} 3G_f \#_s (NG_f \#_s) (NG_f \#_s)^{-1} \rangle$
 $\langle \text{vuestras}, D_{\text{poss2pp}} 3G_f \#_p (NG_f \#_p) (NG_f \#_p)^{-1} \rangle$
 $\langle \text{su}, D_{\text{poss2/3ps}} 3G_x \#_s (NG_x \#_s) (NG_x \#_s)^{-1} \rangle$
 $\langle \text{sus}, D_{\text{poss2/3pp}} 3G_x \#_p (NG_x \#_p) (NG_x \#_p)^{-1} \rangle$

And so on.

In her zeal to always catch the generalization, the reader is probably wondering about the fact that the string of categories of the general form $(NG_x \#_y) (NG_x \#_y)^{-1}$ recurs in the specification of every single determiner we have listed above, and about whether there is a way of avoiding this repetition. Well, there is. And even though its adoption would depend on how we specify a number of other word functions I would like to briefly outline two possible ways of approaching the problem.

One would consist in leaving the argument information out of the specification of the determiners:

$\langle \text{el}, D_{\text{def}} 3G_m \#_s \rangle$
 $\cdot$
 $\cdot$
 $\cdot$
 $\langle \text{sus}, D_{\text{poss2/3pp}} 3G_x \#_p \rangle$

and having a separate, phonetically null function that seeks determiners to transitivize them:

$$\langle \emptyset, (D_x 3G_y \#_z)^{-1} (NG_y \#_z) (NG_y \#_z)^{-1} \rangle.$$

One thing this approach would require is to keep this function from transitivizing intrinsically intransitive determiners³ like

$$\langle \text{Rafael}, D_{\text{prop}} 3G_m \#_s \rangle.$$

This could be done by marking every determiner as transitive or intransitive. For example, determiners *el* ... *sus* would be specified as transitive

$$\langle \text{el}, {}_{+t}D_{\text{def}} 3G_m \#_s \rangle$$

$$\langle \text{sus}, {}_{+t}D_{\text{poss2/3pp}} 3G_x \#_p \rangle$$

whereas *Rafael* would be specified as intransitive

$$\langle \text{Rafael}, {}_{-t}D_{\text{prop}} 3G_m \#_s \rangle$$

and the transitivizing function would be specified in such a way that it would only apply to determiners marked $+t$:

$$\langle \emptyset, ({}_{+t}D_x 3G_y \#_z)^{-1} (NG_y \#_z) (NG_y \#_z)^{-1} \rangle.$$

This approach has the advantage of leaving the door open for a wider generalization when specifying the categories that the gender and number suffixes will apply to, namely, it allows us to consider a determiner like, for example, *nuestras*, not as a prime function

³ "[...] grammarians of syntax typically take N to be the head of NP, whereas I take DET to be the head-selector. In fact, I think it is a mistake to think of N as the head of an NP. One should think in terms of DPs, i.e., determiner phrases, not in terms of NPs, as I suggest below, although in reality DPs do not exist [...]" (Brame; 1982: 321, fn1) And if we adhere to this approach, we'll find interesting consequences for the categorial status of proper nouns, which would end up being not Ns but DNs, or they could even be argued to be a special variety of D, intransitive Ds. I adopt the latter approach in this work.

word but as a composite function word, a product of the lexical composition of the determiner stem *nuestr*, the feminine suffix *a*, and the plural suffix *s*, just as we saw in the case of the noun *muchachas* in the first chapter. This approach requires that gender suffixes apply not only to noun stems but also to determiner, and -- as we shall briefly see later-- adjective stems.

2. Nouns

Besides the *-o /-a* gender opposition in Spanish which we have already seen we can find at least three more as can be seen below:

el muchacho/la muchacha 'the young man/the young woman'
el monje/la monja 'the monk/the nun'
el corredor/la corredora 'the runner (m.)/the runner (f.)'
el hombre/la mujer 'the man/the woman'
el cantante/la cantante 'the singer (m.)/the singer (f.)'

M Sg	F Sg	M Pl	F Pl
(1) muchach-o-ø	muchach-a-ø	muchach-o-s	muchach-a-s
(2) monj-e-ø	monj-a-ø	monj-e-s	monj-a-s
(3) hombre-ø	mujer-ø	hombre-s	mujer-es
(4) corredor-ø-ø	corredor-a-ø	corredor-ø-es	corredor-a-s
(5) cantante-ø-ø	cantante-ø-ø	cantante-ø-s	cantante-a-s

As we can see from these five classes of Spanish nouns⁴, there are at least five main ways in which nouns can have morphological gender: through the *-o/-a* opposition, through the *-e/-a* opposition, through the *-ø/-a* opposition, by having a stem already charged with gender, or by the *-ø/-ø* opposition.

⁴ For a statistical view of noun endings in Spanish, see Bull's (1965:109) statistics based on a count of the nouns in E.B. Williams's *Spanish and English dictionary*.

Lexically⁵, we can account for this chunk of Spanish noun morphology with the following functions:

Stems	Gender	Number
<muchach, N ₁ >	<0, N ₁ ⁻¹ N ₁ G _m >	<0, G _y ⁻¹ G _y # _s >
<monj, N ₂ >	<e, N ₂ ⁻¹ N ₂ G _m >	<s, (N _{x x≠4} G _m) ⁻¹ (N _{x x≠4} G _m) # _p >
<hombre, N ₃ G _m >	<0, N _{x x≤4} ⁻¹ N _{x x≤4} G _m >	<s, (N _{x x≠3} G _f) ⁻¹ (N _{x x≠3} G _f) # _p >
<corredor, N ₄ > ⁶	<0, N ₅ ⁻¹ N ₅ G _f >	<es, (N _{x x=4} G _m) ⁻¹ (N _{x x=4} G _m) # _p >
<mujer, N ₄ G _f >	<a, N _{x x≠5} ⁻¹ N _{x x≠5} G _f >	<es, (N _{x x=3} G _f) ⁻¹ (N _{x x=3} G _f) # _p >
<cantante, N ₅ >		

3. Adjectives

Adjectives can be divided up in classes which are quasi-analogous to the noun classes above

M Sg	F Sg	M Pl	F Pl
(1) negr-o-0 'black'	negr-a-0	negr-o-s	negr-a-s
(2) est-e-0	est-a-0	est-e-s	est-a-s

⁵ Taking the lexical integrity principle seriously makes me agree with Brame's view that "phonological rules, like transformations, really should not alter words, stems, or affixes, but should instead serve as instructions for the proper combination of the full range of phonetic alternants, or alternatively, as filters on their proper juxtaposition." So in spite of the fact that the topic occupying us here is morho-syntax, we use noun and adjective morphology to give the reader a flavor of what a lexical categorical treatment of morphophonology would look like. (1979:11)

⁶ We could have alternatively assumed that *corredor*, the stem, already has masculine gender with a lexical specification <corredor, N₃ G_m> and saved ourselves the need to posit the phonetically vacuous <0, N₃⁻¹ N₃ G_m>. However, in order then to derive the feminine form from <corredor, N₃ G_m> we would have to either posit the simultaneous existence of a genderless stem <corredor, N₃> that could still be taken by <a, N_x⁻¹ N_x G_f> to form the feminine, or to posit another feminine gender function along the bizarre lines of <a, (N₃ G_m)⁻¹ N₃ G_f>, a function that changes the intrinsic category of another.

	'this here'			
(3)	francés-Ø-Ø	francés-a-Ø	francés-Ø-es	francés-a-s
	'French'			
(4)	cortés-Ø-Ø	cortés-Ø-Ø	cortés-Ø-es	cortés-Ø-es
	'polite'			
(5)	verde-Ø-Ø	verde-Ø-Ø	verde-Ø-s	verde-Ø-s
	'green'			

and given a lexical treatment along the same lines as the one given above to nouns:

Stems	Gender	Number
$\langle \text{negr}, A_1 \rangle$	$\langle \emptyset, A_1^{-1} A_1 G_m \rangle$	$\langle \emptyset, G_y^{-1} G_y \#_s \rangle$
$\langle \text{est}, A_2 \rangle$	$\langle e, A_2^{-1} A_2 G_m \rangle$	$\langle s, (A_{x x \leq 2 \geq 5} G_m)^{-1} (A_{x x \leq 2 \geq 5} G_m) \#_p \rangle$
$\langle \text{francés}, A_3 \rangle$	$\langle a, A_{x x \leq 3}^{-1} A_{x x \leq 3} G_f \rangle$	$\langle s, (A_{x x \leq 3 \geq 5} G_f)^{-1} (A_{x x \leq 3 \geq 5} G_f) \#_p \rangle$
$\langle \text{cortés}, A_4 \rangle$	$\langle \emptyset, A_{x x \geq 3}^{-1} A_{x x \geq 3} G_m \rangle$	$\langle es, (A_{x 3 \leq x \leq 4} G_m)^{-1} (A_{x 3 \leq x \leq 4} G_m) \#_p \rangle$
$\langle \text{verde}, A_5 \rangle$	$\langle \emptyset, A_{x x \geq 3}^{-1} A_{x x \geq 3} G_f \rangle$	$\langle es, (A_4 G_f)^{-1} (A_4 G_f) \#_p \rangle$

As mentioned earlier and from this brief examination of determiner, noun and adjective⁷ morphology in Spanish, we can see that the number suffix always applies to the gender suffix; the gender suffix, however, applies not only to noun stems but to determiner and adjective stems as well. Even though I will not pursue this unified approach in this work, here's what the specifications of determiners, nouns, adjectives of class 1, for

⁷ Noun-adjective agreement, by the way, can be treated as a function that looks for a noun to its left and for an adjective to its right with same gender and number:

$$\langle \emptyset, (NG_x \#_y)^{-1} (NG_x \#_y) E_{NA} (AG_x \#_y) (AG_x \#_y)^{-1} \rangle$$

Adjective-noun agreement,

$$\langle \emptyset, (AG_x \#_y)^{-1} (AG_x \#_y) E_{AN} (NG_x \#_y) (NG_x \#_y)^{-1} \rangle,$$

the adjective-noun agreement function responsible for adjectives in prenominal position, would require an adjustment in the arguments of the determiners that I will not pursue here.

example, and their corresponding gender and number suffixes would look like:

<nuestr, D_{poss1pp} >	<a, $W_{D,N,A}^{-1}W_{D,N,A}G_f$ >	<s, $G_x^{-1}G_x\#_p$ >
<muchach,N>	<o, $W_{D,N,A}^{-1}W_{D,N,A}G_m$ >	< $\emptyset$, $G_x^{-1}G_x\#_s$ >
<negr,A> ,		

where W is a variable that instantiates as a determiner, a noun, or an adjective. In this way, gender morphemes could apply not only to nouns but also to determiners and adjectives.

III VERBS

1. -ar, -er, -ir

-ar

Indicative

PRESENT

$T_{(pr,in,i)}$ ^a

mir-o⁹

-a-ø-s

-a-ø-ø

-a-ø-mos

-á-ø-is

-a-ø-n

PRETERITE

$T_{(pa,in,p)}$

mir-é

-a-ste

-ó

-a-mos

-a-ste-is

-a-ro-n

FUTURE

$T_{(fu,in,i)}$

mir-a-ré-ø

-a-rá-s

-a-rá-ø

-a-re-mos

-a-ré-is

-a-rá-n

IMPERFECT

$T_{(pa,in,i)}$

mir-a-ba-ø

-a-ba-s

-a-ba-ø

-á-ba-mos

-a-ba-is

-a-ba-n

CONDITIONAL

$T_{(fu/pa,in,i)}$

mir-a-ría-ø

-a-ría-s

-a-ría-ø

-a-ría-mos

-a-ría-is

-a-ría-n

Subjunctive

PRESENT

$T_{(pr,su,i)}$

mir-ø-ø

-e-s

-e-ø

-e-mos

-é-is

IMPERFECT-1

$T_{(pa,su,i)}$

mir-a-ra-ø

-a-ra-s

-a-ra-ø

-á-ra-mos

-a-ra-is

IMPERFECT-2

$T_{(pa,su,i)2}$

mir-a-se-ø

-a-se-s

-a-se-ø

-a-se-mos

-a-se-is

FUTURE

$T_{(fu,su,i)}$

mir-a-re-ø

-a-re-s

-a-re-ø

-á-re-mos

-a-re-is

^a Abbreviations for Tense: pr := present; pa := past; future; fu/pa := conditional.

For Mood: in := indicative; su := subjunctive.

For Aspect: p:= perfective; i:= imperfective.

⁹ *mirar* 'to look'.

-e-n

-a-ra-n

-a-se-n

-a-re-n

It seems clear, from looking at the verbal paradigms above, that the person/number suffixes of the *-ar* conjugation in Spanish --except for the present indicative and the preterite-- are:

$$\begin{aligned} &\langle \emptyset, T_{(T,M,A)}^{-1} T_{(T,M,A)}^1 \#s \rangle \\ &\langle s, T_{(T,M,A)}^{-1} T_{(T,M,A)}^2 \#s \rangle \\ &\langle \emptyset, T_{(T,M,A)}^{-1} T_{(T,M,A)}^3 \#s \rangle \\ &\langle \text{mos}, T_{(T,M,A)}^{-1} T_{(T,M,A)}^1 \#p \rangle \\ &\langle \text{is}, T_{(T,M,A)}^{-1} T_{(T,M,A)}^2 \#p \rangle \\ &\langle \text{n}, T_{(T,M,A)}^{-1} T_{(T,M,A)}^3 \#p \rangle \end{aligned}$$

The tense/aspect suffixes --except for the present, preterite and future indicative-- are:

$$\begin{aligned} &\langle \text{ba}, \emptyset_a^{-1} \emptyset_a T_{(\text{pa}, \text{in}, \text{i})} \rangle \\ &\langle \text{ría}, \emptyset_a^{-1} \emptyset_a T_{(\text{fu}/\text{pa}, \text{in}, \text{i})} \rangle \\ &\langle \text{e}, V_a^{-1} V_a \emptyset_a T_{(\text{pr}, \text{su}, \text{i})} \rangle \\ &\langle \text{ra}, \emptyset_a^{-1} \emptyset_a T_{(\text{pa}, \text{su}, \text{i})} \rangle \\ &\langle \text{se}, \emptyset_a^{-1} \emptyset_a T_{(\text{pa}, \text{su}, \text{i})}^2 \rangle \\ &\langle \text{re}, \emptyset_a^{-1} \emptyset_a T_{(\text{fu}, \text{su}, \text{i})} \rangle \end{aligned}$$

Where the argument they take on the left --except for $\langle \text{e}, V_a^{-1} V_a \emptyset_a T_{(\text{pr}, \text{su}, \text{i})} \rangle$ -- is the thematic vowel of the first conjugation verbs: $\langle \text{a}, V_a^{-1} V_a \emptyset_a \rangle$.

The present indicative and the preterite pose the problem of irregularity in the thematic vowel, and/or the tense/aspect, and/or the person/number suffixes.

We can generate all the present indicative forms by positing

$$\langle \emptyset, \emptyset_a^{-1} \emptyset_a T_{(\text{pr}, \text{in}, \text{i})} \rangle$$

as the tense/aspect suffix, and

$$\langle \emptyset, V_a^{-1} V_a \emptyset_a T_{(pr, in, i)}^1 \#s \rangle$$

as the syncretic thematic-vowel/tense/aspect/person/number suffix for the first person singular of the present indicative. And notice that there is no possibility of overgeneration along the lines of the regular first person singular morpheme $\langle \emptyset, T_{(T, M, A)}^{-1} T_{(T, M, A)}^1 \#s \rangle$ taking the $T_{(pr, in, i)}$ since the latter is flanked on the right by $1\#s$ already, i.e. this type of overgeneration is blocked. This automatic blocking occurs even though the only thing we have done is, first, specify the regular functions, second, specify the irregular function with no need to go back and revise the regular functions. In this work we will use this uncomplicated treatment of irregularity whenever possible, for example, with the preterite and the future indicative.¹⁰

For the preterite we posit

$$\langle \acute{e}, V_a^{-1} V_a \emptyset_a T_{(pa, in, p)}^1 \#s \rangle$$

¹⁰ This is not, however the only type of overgeneration possible here. One other kind is the possibility, given the treatment of irregularity offered above, of generating in addition to the "standard" $\langle habio, V_a \emptyset_a T_{(pr, in, i)}^1 \#s \rangle$, the non-standard

$\langle habla, V_a \emptyset_a T_{(pr, in, i)}^1 \#s \rangle$ as the reader can straightforwardly confirm.

This happens because there is nothing preventing $\langle \emptyset, \emptyset_a^{-1} \emptyset_a T_{(pr, in, i)} \rangle$ and

$\langle \emptyset, T_{(T, M, A)}^{-1} T_{(T, M, A)}^1 \#s \rangle$ from coming together through LCR.

One simple --although not without a certain amount of injustice-- way of generating the former but not the latter is to prevent lexical composition between

$\langle \emptyset, \emptyset_a^{-1} \emptyset_a T_{(pr, in, i)} \rangle$ and $\langle \emptyset, T_{(T, M, A)}^{-1} T_{(T, M, A)}^1 \#s \rangle$ by treating all the endings of the present indicative as syncretic so that there's no function of the type

$\langle x, \emptyset_a^{-1} \emptyset_a T_{(pr, in, i)} \rangle$ (i.e., present indicative functions with an "exposed" $T_{(pr, in, i)}$ on their right) that could be taken by any of the regular person number ending functions, i.e. functions of the type $\langle y, T_{(T, M, A)}^{-1} T_{(T, M, A)}^1 \#z \rangle$. The injustice here is that the person/number endings of the present indicative are innocent of irregularity and yet, because of their association with the irregular thematic vowel, are being locked-up with the latter.

Another way of dealing with this irregularity is to simply allow for the generation of the "non-standard" first person singular present as well as the "standard", which is the way opted for in this work, with the knowledge that this lexical grammar allows for the less suppletive approach presented in the previous paragraph.

$\langle \text{ste}, \emptyset_a^{-1} \emptyset_a T_{(pa, in, p)}^2 \#s \rangle$
 $\langle \acute{o}, V_a^{-1} V_a \emptyset_a T_{(pa, in, p)}^3 \#s \rangle$
 $\langle \text{mos}, \emptyset_a^{-1} \emptyset_a T_{(pa, in, p)}^1 \#p \rangle$
 $\langle \text{steis}, \emptyset_a^{-1} \emptyset_a T_{(pa, in, p)}^2 \#p \rangle$
 $\langle \text{ron}, \emptyset_a^{-1} \emptyset_a T_{(pa, in, p)}^3 \#p \rangle$

And we'll give the future indicative (to avoid otherwise interesting complications) a treatment similar to the preterite

$\langle \text{ré}, \emptyset_a^{-1} \emptyset_a T_{(fu, in, i)}^1 \#s \rangle$
 $\langle \text{rás}, \emptyset_a^{-1} \emptyset_a T_{(fu, in, i)}^2 \#s \rangle$
 $\langle \text{rá}, \emptyset_a^{-1} \emptyset_a T_{(fu, in, i)}^3 \#s \rangle$
 $\langle \text{remos}, \emptyset_a^{-1} \emptyset_a T_{(fu, in, i)}^1 \#p \rangle$
 $\langle \text{réis}, \emptyset_a^{-1} \emptyset_a T_{(fu, in, i)}^2 \#p \rangle$
 $\langle \text{rán}, \emptyset_a^{-1} \emptyset_a T_{(fu, in, i)}^3 \#p \rangle$

-er Indicative

PRESENT

$T_{(pr, in, i)}$
 com- $\emptyset^{11}$

-e- $\emptyset$ -s
 -e- $\emptyset$ - $\emptyset$
 -e- $\emptyset$ -mos
 -é- $\emptyset$ -is
 -e- $\emptyset$ -n

PRETERITE

$T_{(pa, in, p)}$
 com-í- $\emptyset$

-i-ste
 -i- $\acute{o}$
 -i-mos
 -i-ste-is
 -ie-ro-n

FUTURE

$T_{(fu, in, i)}$
 com-e-ré- $\emptyset$

-e-rá-s
 -e-rá- $\emptyset$
 -e-re-mos
 -e-ré-is
 -e-rá-n

IMPERFECT

$T_{(pa, in, i)}$
 com-í-a- $\emptyset$

-í-a-s
 -í-a- $\emptyset$
 -í-a-mos

CONDITIONAL

$T_{(fu, pa, in, i)}$
 com-e-ría- $\emptyset$

-e-ría-s
 -e-ría- $\emptyset$
 -e-ría-mos

¹¹ *comer* 'to eat'.

-í-a-is
-í-a-n

-e-ría-is
-e-ría-n

Subjunctive

PRESENT	IMPERFECT-1	IMPERFECT-2	FUTURE
$T_{(pr,su,i)}$	$T_{(pa,su,i)}$	$T_{(pa,su,i)2}$	$T_{(fu,su,i)}$
com-a-ø	com-ie-ra-ø	com-ie-se-ø	com-ie-re-ø
-a-s	-ie-ra-s	-ie-se-s	-ie-re-s
-a-ø	-ie-ra-ø	-ie-se-ø	-ie-re-ø
-a-mos	-ié-ra-mos	-ié-se-mos	-ié-re-mos
-á-is	-ie-ra-is	-ie-se-is	-ie-re-is
-a-n	-ie-ra-n	-ie-se-n	-ie-re-n

For the second conjugation we can posit the same person/number functions as the first conjugation, except in the first person singular (where the regular ending does apply to $T_{(pa,in,p)}$, the preterite):

$\langle \emptyset, T_{(T,M,A)}^{-1} T_{(r,M,A)}^1 \#_s \rangle$
 $\langle s, T_{(T,M,A)}^{-1} T_{(T,M,A)}^2 \#_s \rangle$
 $\langle \emptyset, T_{(T,M,A)}^{-1} T_{(T,M,A)}^3 \#_s \rangle$
 $\langle mos, T_{(T,M,A)}^{-1} T_{(T,M,A)}^1 \# \rangle$
 $\langle is, T_{(T,M,A)}^{-1} T_{(T,M,A)}^2 \#_p \rangle$
 $\langle n, T_{(T,M,A)}^{-1} T_{(T,M,A)}^3 \#_p \rangle$

And we still need a special ending for the first person singular of the present:

$\langle \emptyset, V_e^{-1} V_e \emptyset T_{(pr,in,i)}^1 \#_s \rangle$

As in the first conjugation, we need special preterite endings:

$\langle í, V_e^{-1} V_e \emptyset T_{(pa,in,p)}^1 \#_s \rangle$
 $\langle ste, \emptyset_i^{-1} \emptyset T_{(pa,in,p)}^2 \# \rangle$
 $\langle ó, \emptyset_i^{-1} \emptyset T_{(pa,in,p)}^3 \#_s \rangle$

$\langle \text{mos}, \emptyset_i^{-1} \emptyset_i T_{(\text{pa}, \text{in}, \text{p})} 1 \# \text{p} \rangle$
 $\langle \text{steis}, \emptyset_i^{-1} \emptyset_i T_{(\text{pa}, \text{in}, \text{p})} 2 \# \text{p} \rangle$
 $\langle \text{ron}, \emptyset_{ie}^{-1} \emptyset_{ie} T_{(\text{pa}, \text{in}, \text{p})} 3 \# \text{p} \rangle$

There are three different thematic vowels for the second conjugation:

$\langle \text{e}, V_e^{-1} V_e \emptyset_e \rangle$
 $\langle \text{ie}, V_e^{-1} V_e \emptyset_{ie} \rangle$
 $\langle \text{i}, V_e^{-1} V_e \emptyset_i \rangle$

and they are the arguments to the left of the different tenses:

$\langle \text{a}, \emptyset_i^{-1} \emptyset_i T_{(\text{pa}, \text{in}, \text{i})} \rangle$
 $\langle \text{ría}, \emptyset_e^{-1} \emptyset_e T_{(\text{fu}/\text{pa}, \text{in}, \text{i})} \rangle$
 $\langle \text{a}, V_e^{-1} V_e \emptyset_a T_{(\text{pr}, \text{su}, \text{i})} \rangle$
 $\langle \text{ra}, \emptyset_{ie}^{-1} \emptyset_{ie} T_{(\text{pa}, \text{su}, \text{i})} \rangle$
 $\langle \text{se}, \emptyset_{ie}^{-1} \emptyset_{ie} T_{(\text{pa}, \text{su}, \text{i})} 2 \rangle$
 $\langle \text{re}, \emptyset_{ie}^{-1} \emptyset_{ie} T_{(\text{fu}, \text{su}, \text{i})} \rangle$

Finally, the future endings are the same as in the first conjugation:

$\langle \text{ré}, \emptyset_e^{-1} \emptyset_e T_{(\text{fu}, \text{in}, \text{i})} 1 \# \text{s} \rangle$
 $\langle \text{rás}, \emptyset_e^{-1} \emptyset_e T_{(\text{fu}, \text{in}, \text{i})} 2 \# \text{s} \rangle$
 $\langle \text{rá}, \emptyset_e^{-1} \emptyset_e T_{(\text{fu}, \text{in}, \text{i})} 3 \# \text{s} \rangle$
 $\langle \text{remos}, \emptyset_e^{-1} \emptyset_e T_{(\text{fu}, \text{in}, \text{i})} 1 \# \text{p} \rangle$
 $\langle \text{réis}, \emptyset_e^{-1} \emptyset_e T_{(\text{fu}, \text{in}, \text{i})} 2 \# \text{p} \rangle$
 $\langle \text{rán}, \emptyset_e^{-1} \emptyset_e T_{(\text{fu}, \text{in}, \text{i})} 3 \# \text{p} \rangle$

-ir

Indicative

PRESENT

PRETERITE

FUTURE

$T_{(pr,in,i)}$ viv- o ¹²	$T_{(pa,in,p)}$ viv- í-ø	$T_{(fu,in,i)}$ viv- i-ré-ø
-e-ø-s	-i-ste	-i-rá-s
-e-ø-ø	-i-ó	-i-rá-ø
-i-ø-mos	-i-mos	-i-re-mos
-í-ø-s	-i-ste-is	-i-ré-is
-e-ø-n	-ie-ro-n	-i-rá-n

IMPERFECT	CONDITIONAL
$T_{(pa,in,i)}$ viv- í-a-ø	$T_{(fu/pa,in,i)}$ viv- i-ría-ø
-í-a-s	-i-ría-s
-í-a-ø	-i-ría-ø
-í-a-mos	-i-ría-mos
-í-a-is	-i-ría-is
-í-a-n	-i-ría-n

Subjunctive

PRESENT	IMPERFECT-1	IMPERFECT-2	FUTURE
$T_{(pr,su,i)}$ viv- a-ø	$T_{(pa,su,i)}$ viv- ie-ra-ø	$T_{(pa,su,i)2}$ viv- ie-se-ø	$T_{(fu,su,i)}$ viv- ie-re-ø
-a-s	-ie-ra-s	-ie-se-s	-ie-re-s
-a-ø	-ie-ra-ø	-ie-se-ø	-ie-re-ø
-a-mos	-ié-ra-mos	-ié-se-mos	-ié-re-mos
-á-is	-ie-ra-is	-ie-se-is	-ie-re-is
-a-n	-ie-ra-n	-ie-se-n	-ie-re-n

For the third conjugation we have the same person/number endings as for the second:

$$\begin{aligned}
 &<\emptyset, T_{(T,M,A)}^{-1} T_{(T,M,A)}^1 \#s> \\
 &<s, T_{(T,M,A)}^{-1} T_{(T,M,A)}^2 \#s> \\
 &<\emptyset, T_{(T,M,A)}^{-1} T_{(T,M,A)}^3 \#s> \\
 &<mos, T_{(T,M,A)}^{-1} T_{(T,M,A)}^1 \#p> \\
 &<is, T_{(T,M,A)}^{-1} T_{(T,M,A)}^2 \#p>
 \end{aligned}$$

¹² *vivir* 'to live' .

$$\langle n, T_{(T,M,A)}^{-1} T_{(T,M,A)}^3 \# p \rangle$$

For the present indicative of the -ir conjugation is like the -ar and the -er conjugations except in the first and second person plural, as can be seen from the paradigm of *vivir*, because in these two cases the thematic vowel is not *i*, the thematic vowel for all other -ir tenses except for the third person plural of the preterite. Therefore, we need special endings in order to generate the first and second person plural. One way of doing this is by assuming syncretic endings for these two instances:

$$\begin{aligned} &\langle \text{imos}, V_i^{-1} V_i \emptyset T^1 2 \# p \rangle \\ &\langle \text{is}, V_i^{-1} V_i \emptyset T^1 2 \# p \rangle \end{aligned}$$

And we still need a special ending for the first person singular of the present indicative just as we did for -ar verbs:

$$\langle o, V_i^{-1} V_i \emptyset T^1 1 \# s \rangle .$$

The tense/aspect endings are the same as in the second conjugation:

$$\begin{aligned} &\langle a, \emptyset_i^{-1} \emptyset_i T_{(pa, in, i)} \rangle \\ &\langle \text{ría}, \emptyset_e^{-1} \emptyset_e T_{(fu/pa, in, i)} \rangle \\ &\langle a, V_e^{-1} V_e \emptyset_a T_{(pr, su, i)} \rangle \\ &\langle \text{ra}, \emptyset_{ie}^{-1} \emptyset_{ie} T_{(pa, su, i)} \rangle \\ &\langle \text{se}, \emptyset_{ie}^{-1} \emptyset_{ie} T_{(pa, su, i)} 2 \rangle \\ &\langle \text{re}, \emptyset_{ie}^{-1} \emptyset_{ie} T_{(fu, su, i)} \rangle . \end{aligned}$$

And we need --except for the specification of the verb stem in the 1st person singular-- the same endings for the preterite as in the second conjugation:

$$\begin{aligned} &\langle \text{í}, V_i^{-1} V_i \emptyset_i T_{(pa, in, p)}^1 \# s \rangle \\ &\langle \text{ste}, \emptyset_i^{-1} \emptyset_i T_{(pa, in, p)}^2 \# \rangle \\ &\langle \text{ó}, \emptyset_i^{-1} \emptyset_i T_{(pa, in, p)}^3 \# s \rangle \end{aligned}$$

$\langle \text{mos}, \emptyset_i^{-1} \emptyset_i T_{(\text{pa}, \text{in}, \text{p})} 1 \# \text{p} \rangle$
 $\langle \text{steis}, \emptyset_i^{-1} \emptyset_i T_{(\text{pa}, \text{in}, \text{p})} 2 \# \text{p} \rangle$
 $\langle \text{ron}, \emptyset_{ie}^{-1} \emptyset_{ie} T_{(\text{pa}, \text{in}, \text{p})} 3 \# \text{p} \rangle$

Finally, the future endings are again --except for the thematic vowel-- the same as in the first conjugation:

$\langle \text{ré}, \emptyset_i^{-1} \emptyset_i T_{(\text{fu}, \text{in}, \text{i})} 1 \# \text{s} \rangle$
 $\langle \text{rás}, \emptyset_i^{-1} \emptyset_i T_{(\text{fu}, \text{in}, \text{i})} 2 \# \text{s} \rangle$
 $\langle \text{rá}, \emptyset_i^{-1} \emptyset_i T_{(\text{fu}, \text{in}, \text{i})} 3 \# \text{s} \rangle$
 $\langle \text{remos}, \emptyset_i^{-1} \emptyset_i T_{(\text{fu}, \text{in}, \text{i})} 1 \# \text{p} \rangle$
 $\langle \text{réis}, \emptyset_i^{-1} \emptyset_i T_{(\text{fu}, \text{in}, \text{i})} 2 \# \text{p} \rangle$
 $\langle \text{rán}, \emptyset_i^{-1} \emptyset_i T_{(\text{fu}, \text{in}, \text{i})} 3 \# \text{p} \rangle$

2. Subject-verb agreement

Using the lexical specifications developed for verbs in the previous section we can readily derive a verb like *miraron*:

1. $\langle \text{mir}, V_a \rangle @ \langle \acute{o}, V_a^{-1} V_a \emptyset_a T_{(\text{pa}, \text{in}, \text{p})} 3 \# \text{s} \rangle$
2. $\langle \text{miró}, V_a \emptyset_a T_{(\text{pa}, \text{in}, \text{p})} 3 \# \text{p} \rangle$, by LCR applied to line 2.

And from Chapter II we already know that we can derive:

$\langle \text{el muchacho}, D_{\text{def}} 3 G_m \#_s N G_m \#_s \rangle$

Now the question can be raised as to how can *miró* and *el muchacho* combine to form *el muchacho miró*. Well, if we assume that it is *el muchacho* that seeks *miró*, we condemn *el muchacho* to an existence as subject when we know that it can perfectly well be, among other things, the object --direct or indirect-- of a verb or a preposition as in:

la muchacha miró al muchacho

'the young woman looked at the young man'

la muchacha le escribió una carta al muchacho

'the young woman wrote a letter to the young man'

la madre del muchacho

'the mother of the young man'

On the other hand, if we assume that it is *miró* that seeks *el muchacho* to its left, we would be condemning *miró* to a post-subject existence when again we know perfectly well that it can appear in pre-subject position also as in:

*¿qué miró el muchacho?*¹³

'what did the young man look at?'

Therefore we choose to deal with subject-verb agreement through a phonetically vacuous function which we can call S_{sv} and whose effect for *el muchacho* and *miró* we can express as follows:

1. $\langle \emptyset, S_{sv} C_1 C_2 C_2^{-1} C_1^{-1} \rangle @ \langle \text{el muchacho}, C_1 \rangle @ \langle \text{miró}, C_2 \rangle$
2. $\langle \text{el muchacho}, S_{sv} C_1 C_2 C_2^{-1} \rangle @ \langle \text{miró}, C_2 \rangle$ by LCR applied to line 1.
3. $\langle \text{el muchacho miró}, S_{sv} C_1 C_2 \rangle$ by LCR applied to line 2.

Since here $C_1 = V_a \emptyset_a T_{(pa, in, p)}^3 \# p$ and $C_2 = D_{def}^3 G_m \#_s NG_m \#_s$ then the full specification of S_{sv} for the particular case of *el muchacho* and *miró* is

$$\langle \emptyset, S_{sv} (D_{def}^3 G_m \#_s NG_m \#_s) (V_a \emptyset_a T_{(pa, in, p)}^3 \# p) (V_a \emptyset_a T_{(pa, in, p)}^3 \# p)^{-1} (D_{def}^3 G_m \#_s NG_m \#_s)^{-1} \rangle$$

and in general, for any determiner and any verb that agree in person and number,

$$\langle \emptyset, S_{sv} (D_x rG_y \#_z NG_y \#_z) (V_r \emptyset_s T_{(t, m, a)}^n \# z) (V_r \emptyset_s T_{(t, m, a)}^n \# z)^{-1} (D_x rG_y \#_z NG_y \#_z)^{-1} \rangle.$$

Notice this version of S_{sv} picks up not only $D_x rG_y \#_z$, a

¹³ Wh-words, qu-words in Spanish, are treated in chapter 6, where they are specified as functions that seek to their right first for a verb and only then, and still to their right, for a determiner (the determiner, if transitive, will in turn seek a noun), thus yielding the following word order: qu-word/verb/subject.

determiner, but $D_x nG_y \#_z$, a determiner and the noun picked up by it. After a closer look, it seems clear that there is no need to worry about picking up the noun since this is already done by the determiner; furthermore, there is no reason to exclude intransitive determiners like $\langle \text{Rafael}, D_{\text{prop}} 3G_m \#_s \rangle$ from being picked up as subjects. For these two reasons, it seems appropriate to trim S_{sv} along the following lines¹⁴

$$\langle \emptyset, S_{sv}(D_x nG_y \#_z)(V_r \emptyset_s T_{(t,m,a)} n \#_z) \\ (V_r \emptyset_s T_{(t,m,a)} n \#_z)^{-1} (D_x nG_y \#_z)^{-1} \rangle^{15}$$

At this point, given both the increasing number of categories involved in the specification of the functions that are being discussed as well as the reader's hopefully increasing familiarity with this lexical grammar, it seems appropriate to introduce a couple of useful mathematical identities.

3. Mathematical interlude

First, we introduce an identity that expresses the relationship between function composition and function inverses

$$(f * g)^{-1} = g^{-1} * f^{-1},$$

¹⁴ In fact, this "trimming" could be taken further as soon as we notice that the categories $V_r \emptyset_s$ are not relevant for subject verb agreement, the only relevant categories in this process are $T_{(t,m,a)} n \#_z$, i.e., the categories of tense (tense, mood, aspect), person, and number. The result of this further trimming would be

$$\langle \emptyset, S_{sv}(D_x nG_y \#_z)(V_r \emptyset_s T_{(t,m,a)} n \#_z)(V_r \emptyset_s T_{(t,m,a)} n \#_z)^{-1} (D_x nG_y \#_z)^{-1} \rangle$$

This would require revising the specifications of the verbal categories $\emptyset$ and T in such a way as to let V and $\emptyset$ to cancel. This can be simply done by not using the solution proposed in (8).

However, there are morphosyntactic processes that depend on the peculiarities of the verb stem V (whether, for example, the stem expresses so-called "influence", "emotion", "doubt", "negation", etc.) as we shall see when we discuss conjunctions in chapter 6. Because of this we choose to preserve V and $\emptyset$.

¹⁵ The reader may have noticed that the first two sets of parentheses in the Subject-verb agreement function are redundant. I use them anyway so the reader can discern more easily the categories of the determiner from those of the noun.

where f and g are functions, $*$ is composition of functions, g^{-1} and f^{-1} are the inverse functions of g and f respectively. We have been treating grammatical categories and their inverses as functions, so in the vernacular of grammatical categories the identity above reads as follows

$$(C_1 C_2)^{-1} = C_2^{-1} C_1^{-1},$$

where C_1 and C_2 are strings of grammatical categories, $C_1 C_2$ is the composition of C_1 and C_2 , and C_1^{-1} and C_2^{-1} are respectively their inverse categories. What this identity does is summarize the fact that the inverse of the composition of two categories C_1 and C_2 (i.e., what appears to the left of the equal sign) is for our purposes the same as the composition of the inverses of C_2 and C_1 (i.e., what appears to the right of the equal sign). We will refer to this identity as the **socks and shoes identity (SASI)**.¹⁶

Second, we introduce an abbreviatory definition, so as to not have to repeat categories that we want to preserve, which as we have seen doubles the typographical length of our functions:

Definition 1 (Def.1):

- a. $\langle x, C_1 C_2 C_2^{-1} C_3 \rangle := \langle x, C_1 C_2 : (1^{-1}) C_3 \rangle$
- b. $\langle x, C_1 C_2^{-1} C_2 C_3 \rangle := \langle x, C_1 C_2 : (-1+1) C_3 \rangle,$
 where C_1, C_2 , and C_3 are strings of
 categories.

We can see the effects of SASI and Def.1 clearly if we apply them to the Subject-verb agreement function:

1.

¹⁶ Think of putting on your socks and putting on your shoes as two different functions, C_1 and C_2 , respectively. When you put on your socks and then put on your shoes, you have composed the two functions (i.e. $C_1 C_2$). To undo what you have done (i.e., $(C_1 C_2)^{-1}$) you have to first take off your shoes and only then your socks (i.e., $C_2^{-1} C_1^{-1}$). See Serrano (119-120) or Wall (132) for proofs of this identity.

- $\langle \emptyset, S_{sv}(D_x nG_y \#_z)(V_r \emptyset_s T_{(t,m,a)n\#z})(V_r \emptyset_s T_{(t,m,a)n\#z})^{-1}(D_x nG_y \#_z)^{-1} \rangle$.
2. $\langle \emptyset, S_{sv}(D_x nG_y \#_z)(V_r \emptyset_s T_{(t,m,a)n\#z})((D_x nG_y \#_z)(V_r \emptyset_s T_{(t,m,a)n\#z}))^{-1} \rangle$
by SASI applied to line 1.
3. $\langle \emptyset, S_{sv}((D_x nG_y \#_z)(V_r \emptyset_s T_{(t,m,a)n\#z}))^{(-1-1)} \rangle$ by Def.1 applied to line 2.

One interesting property and one problematic ambiguity of $C^{(-1-1)}$ and $C^{(-1+1)}$ is summarized in the following derivations:

a.

1. $\langle x, C_1 C_2^{(-1-1)} \rangle @ \langle y, C_2^{(-1-1)} C_3 \rangle$.
2. $\langle x, C_1 C_2 C_2^{-1} \rangle @ \langle y, C_2 C_2^{-1} C_3 \rangle$ by Def.1 applied to line 1.
3. $\langle x, C_1 ((C_2 C_2^{-1})^{-1})^{-1} \rangle @ \langle y, C_2 C_2^{-1} C_3 \rangle$ by DIR applied to line 2.
4. $\langle x, C_1 ((C_2^{-1})^{-1} C_2^{-1})^{-1} \rangle @ \langle y, C_2 C_2^{-1} C_3 \rangle$ by SASI applied to line 3.
5. $\langle x, C_1 (C_2 C_2^{-1})^{-1} \rangle @ \langle y, C_2 C_2^{-1} C_3 \rangle$ by DIR applied to line 4.

And now's when the ambiguity arises because we have two possible steps six, one in which we apply LCR to line 5:

6. $\langle xy, C_1 C_3 \rangle$ by LCR applied to line 5.

which ends the derivation, and which shows us that $(C^{(-1-1)})^{-1} = C^{(-1-1)}$ and another one in which we apply LCR to line 2:

- 3'. $\langle xy, C_1 C_2 C_2^{-1} C_3 \rangle$ by LCR applied to line 2.

which leaves $C_2 C_2^{-1}$ blocked and uncanceled. A similar problem arises with

- b. $\langle x, C_1 C_2^{(-1+1)} \rangle @ \langle y, C_2^{(-1+1)} C_3 \rangle$.

This ambiguity, however, can be avoided by making the scope of LCR maximal, i.e., by making LCR apply to the maximum number of cancelable categories (through SASI if necessary) or by stating that any function word with the general form

$$\langle x, C_1 C_2 C_2^{-1} C_3 \rangle, \text{ where } C_1, C_2, C_3 \neq 1,$$

i.e., any word with categories that cannot cancel is ungrammatical.

4. Verb-direct object agreement and direct object clitics

How can we combine, given the approach we have been following, a function like

$$\langle \text{miró}, V_a \emptyset_a T_{(pa, in, p)} 3 \#_p \rangle$$

with, say,

$$\langle \text{el velero}, D_{\text{def}} 3G_m \#_s NG_m \#_s \rangle ?$$

‘the sailboat’

One way of answering this is with a function that to its left seeks a verb and to its right seeks a determiner, something like

$$\langle \emptyset, (V_a \emptyset_a T_{(pa, in, p)} 3 \#_p)^{-1} (V_a \emptyset_a T_{(pa, in, p)} 3 \#_p) O_d (D_{\text{def}} 3G_m \#_s NG_m \#_s) (D_{\text{def}} 3G_m \#_s NG_m \#_s)^{-1} \rangle$$

which, abbreviated by SASI and Def.1, would look like

$$\langle \emptyset, (V_a \emptyset_a T_{(pa, in, p)} 3 \#_p)^{(-1+1)} O_d (D_{\text{def}} 3G_m \#_s NG_m \#_s)^{(1-1)} \rangle$$

and which, generalized to any (simple) verb and any determiner, would look like

$$\langle \emptyset, (V_r \emptyset_s T_{(t, m, a)} n \#_z)^{(-1+1)} O_d (D_x rG_y \#_z NG_y \#_z)^{(1-1)} \rangle.$$

Let's use this O_d function to derive *miró el velero* :

1. $\langle \text{miró}, V_a \emptyset_a T_{(pa, in, p)} 3 \#_p \rangle \odot$
 $\langle \emptyset, (V_r \emptyset_s T_{(t, m, a)} n \#_z) : (-1+1) O_d(D_x n G_y \#_z N G_y \#_z) : (1-1) \rangle \odot$
 $\langle \text{el velero}, D_{def} 3G_m \#_s N G_m \#_s \rangle$
2. $\langle \text{miró}, V_a \emptyset_a T_{(pa, in, p)} 3 \#_p \rangle \odot$
 $\langle \emptyset, (V_a \emptyset_a T_{(pa, in, p)} 3 \#_p) : (-1+1) O_d(D_{def} 3G_m \#_s N G_m \#_s) : (1-1) \rangle \odot$
 $\langle \text{el velero}, D_{def} 3G_m \#_s N G_m \#_s \rangle$ by VIR applied to line 1.
3. $\langle \text{miró}, (V_a \emptyset_a T_{(pa, in, p)} 3 \#_p) O_d(D_{def} 3G_m \#_s N G_m \#_s) : (1-1) \rangle \odot$
 $\langle \text{el velero}, D_{def} 3G_m \#_s N G_m \#_s \rangle$ by LCR applied to line 2.
4. $\langle \text{miró el velero}, (V_a \emptyset_a T_{(pa, in, p)} 3 \#_p) O_d(D_{def} 3G_m \#_s N G_m \#_s) \rangle$ by LCR applied to line 3.

As we have seen, the solution I have offered to account for the agreement between a verb and a direct object recurs to a phonetically empty function word O_d . However, in addition to O_d , Spanish also has a phonetically non-empty function word *a* which marks determiners when the nouns they take are a person or are personified, and whose stem we subscript with a 'p': N_p . We can specify the personal *a* in a similar way as we did O_d :

$$\langle a, (V_r \emptyset_s T_{(t, m, a)} n \#_z) : (-1+1) O_{dp}(D_x n G_y \#_z N_p G_y \#_z) : (1-1) \rangle$$

As the reader can see the only difference between O_d and O_{dp} is that the latter is phonetically non-empty and will only take determiners that have combined with nouns marked as personal. (This, of course, means that the feature 'personal' has to be part of the specification of noun stems, for example $\langle \text{muchach}, N_p \rangle$.) Let's see O_{dp} in action in the derivation of *miró a la muchacha*:

1. $\langle \text{miró}, V_a \emptyset_a T_{(pa, in, p)} 3 \#_p \rangle \odot$
 $\langle a, (V_r \emptyset_s T_{(t, m, a)} n \#_z) : (-1+1) O_{dp}(D_x n G_y \#_z N_p G_y \#_z) : (1-1) \rangle \odot$
 $\langle \text{la muchacha}, D_{def} 3G_f \#_s N_p G_f \#_s \rangle$
2. $\langle \text{miró}, V_a \emptyset_a T_{(pa, in, p)} 3 \#_p \rangle \odot$
 $\langle a, (V_a \emptyset_a T_{(pa, in, p)} 3 \#_p) : (-1+1) O_d(D_{def} 3G_f \#_s N_p G_f \#_s) : (1-1) \rangle \odot$
 $\langle \text{la muchacha}, D_{def} 3G_f \#_s N_p G_f \#_s \rangle$ by VIR applied

- to line1.
3. $\langle \text{miró } a, (V_a \emptyset_a T_{(pa, in, p)} 3 \#_p) O_{dp}(D_{def} 3G_f \#_s N_p G \#_s) : (1-1) \rangle_{\odot}$
 $\langle \text{la muchacha}, D_{def} 3G_f \#_s N_p G \#_s \rangle$ by LCR applied
to line 2.
4. $\langle \text{miró } a \text{ la muchacha}, (V_a \emptyset_a T_{(pa, in, p)} 3 \#_p) O_{dp}(D_{def} 3G_f \#_s N_p G \#_s) \rangle$
by LCR applied to line 3.

The problem of verb-direct object agreement can also be dealt with in such a way that the the process in which the verb is transitivized and that in which the determiner is turned into a direct object happen independently. This approach would leave the door open, for example, for grammatical constructions that require a direct object without a corresponding verb. We will encounter this kind of situation in chapter VI, where we will discuss how questions like

- a. *¿Qué miró el muchacho?*
'what did the young man look at?'
- b. *¿A quién miró el muchacho?*
'who(m) did the young man look at?'

can have composite words like

- a. *El velero.* ' (at) the sailboat'
- b. *A la muchacha.* 'at the young woman'

respectively, as possible¹⁷ answers.

As mentioned already, this time we have to turn the determiner phrase into a direct object independently. We can do this with the second half of the old version of the old function word O_d :

$$\langle \emptyset, O_d(D_x nG_y \#_z N G_y \#_z) : (1-1) \rangle$$

¹⁷ Even though highly unmarked from a certain point of view, each of these answers is, of course, just one of the infinitely many contextually appropriate answers to its corresponding question above. And when the speaker chooses the highly unmarked answers under discussion, she aims for certain grammatical structures and agreements --it is these that we are focusing on now.

and analogously for O_{dp} :

$$\langle a, O_{dp}(D_x nG_y \#_z N_p G_y \#_z) : (1 \cdot 1) \rangle.$$

And in order to transitivize a verb we use the first half of the old function word O_d :

$$\langle \emptyset, (V_r \emptyset_s T_{(t,m,a)} n \#_z) : (-1+1) O_d O_d^{-1} \rangle$$

and analogously for O_{dp} :

$$\langle \emptyset, (V_r \emptyset_s T_{(t,m,a)} n \#_z) : (-1+1) O_{dp} O_{dp}^{-1} \rangle.$$

Actually, we are specifying here more than a transitivized verb would need to know, namely, we do not need to distinguish between personal and non-personal direct objects. All a transitivized verb cares about at this point --if the reader excuses this animatistic treatment of linguistic objects-- is that it gets itself a direct object. Therefore we can do without the personal/non-personal distinction in the objectifying functions, we can just specify them as follows:

$$\langle \emptyset, O_d(D_x nG_y \#_z N G_y \#_z) : (1 \cdot 1) \rangle$$

and, for the personal direct object,

$$\langle a, O_d(D_x nG_y \#_z N_p G_y \#_z) : (1 \cdot 1) \rangle.$$

By the same reasoning, we only need one transitivizing function:

$$\langle \emptyset, (V_r \emptyset_s T_{(t,m,a)} n \#_z) : (-1+1) O_d O_d^{-1} \rangle.$$

We turn our attention now to the specification of direct object clitics. Questions like

a. *¿Qué hizo Rafa cuando vió el velero?*

'What did Rafa do when he saw the sailboat?'

b. *¿Qué hizo Rafa cuando vió a la muchacha?*

'What did Rafa do when he saw the young woman?'

can have the following as possible and highly unmarked answers respectively:

a. *Lo miró.* '(he) looked at it.'

b. *La miró.* '(he) looked at her'

Now, the verb *miró* here, in order to be able to combine with the clitics *lo* and *la* has to, on the one hand, be transitive (or have been transitivized) as can be seen from what happens when an intransitive verb like *salió* '(he) went out' combines with *lo* and *la*

a. **Lo salió.*

b. **La salió.*

On the other hand, *miró*, transitive as it has to be in this case, cannot take an object if it is to combine with a direct object clitic, as we can see from

a. **Lo miró al velero.*

b. **La miró a la muchacha.*¹⁸

One way within the our lexical approach of accounting for this somewhat paradoxical problem is simply to specify direct object clitics as word functions that seek verbs that are transitive but have not yet taken a direct object

$$\langle lo, O_{d/pro}(V_r \emptyset T_{(t,m,a)} n \#_z) O_d((V_r \emptyset T_{(t,m,a)} n \#_z) O_d O_d^{-1})^{-1} \rangle$$

¹⁸ a. and b. are considered ungrammatical here at least to the extent that they are not answers to the questions previously introduced. b., for example, is a perfectly possible and highly unmarked portion of the answer to a question like

Question: *¿Estás seguro que Rafa miró a la muchacha?*

'Are you sure Rafa looked at the young woman?'

Answer: *Sí, él la miró a la muchacha.*

'Yes, he looked at her.'

Let's see how this works:

1. $\langle lo, O_{d/pro}(V_r \emptyset_s T_{(t,m,a)} n \#_z) O_d((V_r \emptyset_s T_{(t,m,a)} n \#_z) O_d O_d^{-1})^{-1} \rangle \odot$
 $\langle miró, V_a \emptyset_a T_{(pa,in,p)}^3 \#p \rangle \odot$
 $\langle \emptyset, (V_r \emptyset_s T_{(t,m,a)} n \#_z) : (-1+1) O_d O_d^{-1} \rangle$
2. $\langle lo, O_{d/pro}(V_a \emptyset_a T_{(pa,in,p)}^3 \#p) O_d((V_a \emptyset_a T_{(pa,in,p)}^3 \#p) O_d O_d^{-1})^{-1} \rangle \odot$
 $\langle miró, V_a \emptyset_a T_{(pa,in,p)}^3 \#p \rangle \odot$
 $\langle \emptyset, (V_a \emptyset_a T_{(pa,in,p)}^3 \#p) : (-1+1) O_d O_d^{-1} \rangle$ by VIR
 applied twice to line 1.
3. $\langle lo, O_{d/pro}(V_a \emptyset_a T_{(pa,in,p)}^3 \#p) O_d((V_a \emptyset_a T_{(pa,in,p)}^3 \#p) O_d O_d^{-1})^{-1} \rangle \odot$
 $\langle miró, (V_a \emptyset_a T_{(pa,in,p)}^3 \#p) O_d O_d^{-1} \rangle$ by LCR to
 line 2.
4. $\langle lo \ miró, O_{d/pro}(V_a \emptyset_a T_{(pa,in,p)}^3 \#p) O_d \rangle$ by LCR to line 3.

Notice that *lo miró*, as derived here cannot in turn be the argument of the transitivity function because of the O_d at the right hand end of its categories.

5. Verb-indirect object agreement and indirect object clitics

To the question

¿A quién le habló? 'Who(m) did (he) talked to?'

a possible and highly unmarked answer can have the same structure as

Le habló a la muchacha. '(He) talked to the young woman.'

As opposed to what we saw in the case of the direct object, the indirect object pronoun is not in complementary distribution with the explicit indirect object, just the opposite, here the appearance of the pronoun form is a necessary condition for the appearance of the explicit form, as we can see from what happens when we try to answer the question without the clitic:

* *Habló a la muchacha* .

On the other hand, *Le habló* , even though ungrammatical as a highly unmarked answer to *A quién le habló* , is a perfectly grammatical string given the appropriate dialogical context:

Question: ¿*Rafa le habló o le gritó a la muchacha?*

'Did Rafa talk or did he yell at the young woman?'

Answer: √*Le habló* .

'(He) talked to her.'

For **Habló a la muchacha* , however, there doesn't seem to exist an appropriate dialogical context in which it could be grammatical. Which means that, as opposed to the treatment we gave the direct object, we cannot simply transitivize a verb to take an indirect object if the verb has not been already taken by an indirect object clitic. Therefore, we seem to have an argument here for the specification of the word functions involved in such a way that *le* would have to combine with *habló* and only then can we consider the possibility of *a la muchacha* combining with *le habló* .

Also, in the case of *le* , for example, as opposed to direct object clitics, it's not enough for *a la muchacha* to take just any direct object clitic-verb string --it has to be one whose clitic is third person singular, as we can see from the paradigm:

- * *le habló a mí.*
- * *le habló a nosotros.*
- * *le habló a ti.*
- * *le habló a ustedes.*¹⁹
- * *le habló a vosotros.*
- * *le habló a ellos.*
- * *le habló a ellas.*

So first, we can specify *le* as an indirect object clitic pronoun that is 3rd person singular and takes verbs to its right:

¹⁹ Strictly speaking we would have to include **le habló a usted* in this list since the *le* under consideration at this point is the third person singular not the second person formal that agrees with *a usted* . It could be argued that they are indeed the same, since the second person formal comes from a third person singular form, *vuestra merced* 'your mercy' (Lathrop:155) I will not pursue the matter here, however.

$$\langle le, O_{i/pro} 3 \#_s (V_r \emptyset_s T_{(t,m,a)} n \#_z) : (1-1) \rangle.$$

Then we specify a function that turns determiners into indirect objects. This function is, except for its intrinsic category, O_i , the same as the personal direct object marker:

$$\langle a, O_i (D_x n G_y \#_z N_p G_y \#_z) : (1-1) \rangle.$$

And, finally we specify a phonetically empty function word that brings together cliticized verbs and explicit indirect objects that agree in person and number:

$$\langle \emptyset, (O_{i/pro} n_i \#_{z1} (V_r \emptyset_s T_{(t,m,a)} n_j \#_{z2})) : (-1+1) \\ (O_i (D_x n_i G_y \#_z N_p G_y \#_{z1})) : (1-1) \rangle.$$

Let's derive *le habló a la muchacha* :

Let's see the derivation of *habló a la muchacha* so we can get an idea of what is it that *le* will have to pick up:

1. $\langle le, O_{i/pro} 3 \#_s (V_r \emptyset_s T_{(t,m,a)} n \#_z) : (1-1) \rangle \odot$
 $\langle habló, V_a \emptyset_a T_{(pa,in,p)} 3 \#_p \rangle \odot$
 $\langle \emptyset, (O_{i/pro} 3 \#_s (V_r \emptyset_s T_{(t,m,a)} n \#_z)) : (-1+1) \\ (O_i (D_x n G_y \#_z N_p G_y \#_z)) : (1-1) \rangle \odot$
 $\langle a, O_i (D_x n G_y \#_z N_p G_y \#_z) : (1-1) \rangle \odot$
 $\langle la \text{ muchacha}, D_{def} 3 G_f \#_s N_p G_f \#_s \rangle.$
2. $\langle le, O_{i/pro} 3 \#_s (V_a \emptyset_a T_{(pa,in,p)} 3 \#_p) : (1-1) \rangle \odot$
 $\langle habló, V_a \emptyset_a T_{(pa,in,p)} 3 \#_p \rangle \odot$
 $\langle \emptyset, (O_{i/pro} 3 \#_s (V_a \emptyset_a T_{(pa,in,p)} 3 \#_p)) : (-1+1) \\ (O_i (D_{def} 3 G_f \#_s N_p G_f \#_s)) : (1-1) \rangle \odot$
 $\langle a, O_i (D_{def} 3 G_f \#_s N_p G_f \#_s) : (1-1) \rangle \odot$
 $\langle la \text{ muchacha}, D_{def} 3 G_f \#_s N_p G_f \#_s \rangle$ by VIR applied everywhere in line 1.
3. $\langle le \text{ habló}, O_{i/pro} 3 \#_s (V_a \emptyset_a T_{(pa,in,p)} 3 \#_p) \rangle \odot$

- $\langle \emptyset, (O_{i/pro} 3 \#_s (V_a \emptyset_a T_{(pa, in, p)} 3 \#_p)) : (-1+1) \rangle$
 $(O_i(D_{def} 3G_f \#_s N_p G \#_s)) : (1-1) \rangle \odot$
 $\langle a, O_i(D_{def} 3G_f \#_s N_p G \#_s) : (1-1) \rangle \odot$
 $\langle \text{la muchacha}, D_{def} 3G_f \#_s N_p G \#_s \rangle$ by LCR applied
 to the 1st and 2nd function words in line 2.
4. $\langle \text{le habló}, O_{i/pro} 3 \#_s (V_a \emptyset_a T_{(pa, in, p)} 3 \#_p) \rangle \odot$
 $\langle \emptyset, (O_{i/pro} 3 \#_s (V_a \emptyset_a T_{(pa, in, p)} 3 \#_p)) : (-1+1) \rangle$
 $(O_i(D_{def} 3G_f \#_s N_p G \#_s)) : (1-1) \rangle \odot$
 $\langle a \text{ la muchacha}, O_i(D_{def} 3G_f \#_s N_p G \#_s) \rangle$ by LCR applied
 to the 3rd and 4th word functions in line 3.
5. $\langle \text{le habló}, O_{i/pro} 3 \#_s (V_a \emptyset_a T_{(pa, in, p)} 3 \#_p) \rangle$
 $(O_i(D_{def} 3G_f \#_s N_p G \#_s)) : (1-1) \rangle \odot$
 $\langle a \text{ la muchacha}, O_i(D_{def} 3G_f \#_s N_p G \#_s) \rangle$ by LCR applied
 to the 1st and 2nd word functions in line 4.
6. $\langle \text{le habló a la muchacha},$
 $O_{i/pro} 3 \#_s (V_a \emptyset_a T_{(pa, in, p)} 3 \#_p) O_i(D_{def} 3G_f \#_s N_p G \#_s) \rangle$
 by LCR applied in line 5.

IV SUPERORDINATE-SUBORDINATE VERB AGREEMENT

In this chapter I use the same mechanisms we have been using so far to show how a lexical grammar can account for the mood and the tense agreement that exists in Spanish between a superordinate verb and a subordinate verb when they are brought together through the mediation of a conjunction. Traditionally, this topic is divided up²⁰ from the point of view of the grammatical category the subordinate sentence belongs to: determiner, adverb, or adjective.²¹

1. Determiner clauses

Determiner clauses generally²² start with the conjunction *que* and function either as subjects or as direct objects.²³ The problem I would like to focus on here is mood agreement, a process which for determiner clauses depends basically²⁴ on the stem of the main verb as we can see from the following paradigm

²⁰ And is, of course, together with yuxtaposed and coordinated sentences, part of the wider topic of compound sentences. See the synopsis in the Real Academia Española (1973:504).

²¹ The Real Academia uses the terms substantive (noun), adjective, and circumstantial sentences (1973:504). Instead of these, or of the more modern substantive, adjective, and adverbial, we use the term **determiner sentence** or **determiner clause** in accordance with our previous assumption that the determiner is the head of the so-called noun phrase.

²² It's not unusual to still find *que*-less determiner clauses in epistolar style, for example, *Te pido vengas pronto*. 'I ask you to come soon.'

²³ Furthermore, in an adverbial clause like the one in *cocino para que comamos* if we argue that *que comamos* is nothing but the object of the preposition *para*, then it could be argued that most adverbial clauses are really prepositions that have taken determiner clauses as their objects. "Bresnan sensed a parallelism here a decade ago and proposed a COMP node to express it. I am suggesting that the parallelism is not structural in her sense, but rather due to the fact that *what*, *that*, and *for* are all function words selecting or mapping complex argument structure. We can more aptly term them 'determiner' functions, and I adopt the category specification D for them all, with additional superscripts to indicate additional relevant feature material. [...] they all map similar complex argument structure." (Brame, 1984:333) In what follows, however, I will treat the clauses above as adverbial clauses, following the traditional division.

²⁴ There are two verbs *sentir* in Spanish, one translates as 'to feel', the other --the one being used in the paradigm-- as 'to be sorry'.

**siento que corres*
siento que corres ²⁵ 'I'm sorry you run'

digo que corres 'I say you run'
digo que corres 'I say you (should) run'

aseguro que corres 'I assure you run'
**aseguro que corres* .

One way to generate these constructions is to, first of all, mark each one of the stems of these verbs with information as to whether they can combine only with subordinate verbs in subjunctive, with verbs in either subjunctive or indicative, or only with verbs in indicative. For example, the lexical specification of the verbs of the paradigm above would be:

<siento, $+s V_i \emptyset T_{(pr, in, p)} 1 \#s$ >
 <digo, $\pm s V_i \emptyset T_{(pr, in, p)} 1 \#s$ >
 <aseguro, $-s V_a \emptyset T_{(pr, in, p)} 1 \#s$ >

Second, if the mood agreement in the sentences of the paradigm under discussion occurs between the super- and subordinate verb then we can argue that there is something between them ensuring that agreement takes place. That something in this case can be argued to be precisely the conjunction *que* :

²⁵ We will not discuss negation in this work, however, even if we include the possibility of the superordinate verb being negated, which in verbs of the family of *asegurar* often opens the possibility for and sometimes even requires the subordinate verb to be in subjunctive, mood agreement still depends on the nature of the stem of the superordinated verb:

**no siento que corres*
no siento que corres

no digo que corres
no digo que corres

no aseguro que corres
no aseguro que corres .

$$\langle \text{que}, (\beta_s V_{x1} \emptyset_{x1} T_{(t1, m, a1)} n_i \#_{y1}) : (-1+1) \\ C(V_{x2} \emptyset_{x2} T_{(t2, \beta_s, a2)} n_j \#_{y2}) : (1-1) \rangle,$$

where β is a variable ranging over the set $\{+, \pm, -\}$; $x1$ and $x2$ range over the possible thematic vowels; $t1$ and $t2$ range over tenses; m ranges over moods; n_i and n_j range over grammatical person²⁶; and $y1$ and $y2$ range over grammatical number.

Let's derive *siento que corras* :

1. $\langle \text{siento}, +s V_i \emptyset_i T_{(pr, in, p)} 1 \#_s \rangle \odot$
 $\langle \text{que}, (\beta_s V_{x1} \emptyset_{x1} T_{(t1, m, a1)} n_i \#_{y1}) : (-1+1) \\ C(V_{x2} \emptyset_{x2} T_{(t2, \beta_s, a2)} n_j \#_{y2}) : (1-1) \rangle \odot$
 $\langle \text{corras}, V_e \emptyset_e T_{(pr, +s, p)} 2 \#_s \rangle.$
2. $\langle \text{siento}, +s V_i \emptyset_i T_{(pr, in, p)} 1 \#_s \rangle \odot$
 $\langle \text{que}, (+s V_i \emptyset_i T_{(pr, in, p)} 1 \#_s) : (-1+1) \\ C(V_{x2} \emptyset_{x2} T_{(t2, +s, a2)} n_j \#_{y2}) : (1-1) \rangle \odot$
 $\langle \text{corras}, V_e \emptyset_e T_{(pr, s, p)} 2 \#_s \rangle$ by applying ViR to the first two functions in line 1.

²⁶ Here, given the way *que* has been specified, the possibility is not excluded that $i = j$ and therefore $n_i = n_j$ as in:

- ✓ *siento_i que corra_j* 'I'm sorry I run', where $n_i = n_j$.
- ✓ *digo_i que corro_j* 'I say I run', where $n_i = n_j$.
- ✓ *digo_i que corra_j* 'I say I (should) run', where $n_i = n_j$.
- ✓ *aseguro_i que corro_j* 'I assure I run', where $n_i = n_j$.

On the other hand, for verbs in the family of *querer*, which behave like *sentir* but require that $n_i \neq n_j$ we would need a *que* specified along the lines of:

$$\langle \text{que}, (\beta_s V_{x1} \emptyset_{x1} T_{(t1, m, a1)} n_i \#_{y1}) : (-1+1) \\ C'(V_{x2} \emptyset_{x2} T_{(t2, \beta_s, a2)} n_{j|j \neq i} \#_{y2}) : (1-1) \rangle.$$

As the reader can see, the only difference between this and the definition of *que* in the text is, on the one hand, the range of the variable j , which does not include i this time, on the other hand, that it maps verbs of the family of *querer* 'to want', whose stem would have to be marked differently ($\beta_s V$) from that of verbs in the family of *sentir* ($\beta_s V$).

3. <siento, $+_s V_i \emptyset T_{(pr, in, p)} 1 \#s$ >©
 <que, $(+_s V_i \emptyset T_{(pr, in, p)} 1 \#s) : (-1+1)$
 $C(V_{\emptyset \emptyset T_{(pr, +s, p)} 2 \#s) : (1-1)$ >©
 <corras, $V_{\emptyset \emptyset T_{(pr, s, p)} 2 \#s}$ > by applying VIR to the
 second and third functions in line 2.
4. <siento que, $(+_s V_i \emptyset T_{(pr, in, p)} 1 \#s) C(V_{\emptyset \emptyset T_{(pr, s, p)} 2 \#s) : (1-1)$ >©
 <corras, $V_{\emptyset \emptyset T_{(pr, s, p)} 2 \#s}$ > by applying LCR to the
 first two functions in line 3.
5. <siento que corras, $(+_s V_i \emptyset T_{(pr, in, p)} 1 \#s) C(V_{\emptyset \emptyset T_{(pr, s, p)} 2 \#s)$ >
 by applying LCR to line 4.

Notice that given the way we have specified *que*, mapping verbs with stems marked βs to its left and mapping verbs not necessarily marked in any particular way to its right as long as it is in subjunctive, nothing prevents it from taking another verb or the βs -marked families to its right, for example

dicen que siento 'they say I'm sorry'

which, in turn, can be taken by *que* by either side, for example the left:

que dicen que siento

which, in turn, will take a verb with a stem marked $-s$ to its left in either mood, for example, indicative:

aseguro que dicen que siento 'I assure they say I'm sorry'

which, in turn, . . . , and so on and so forth. Where, no matter how long a string of words is, there is always a string with more words.

Let's derive the last string.

1. <aseguro, $-_s V_a \emptyset T_{(pr, in, p)} 1 \#s$ >©
 <que, $(\beta_s V_{x1} \emptyset T_{(t1, m, a1)} n_i \#_{y1}) : (-1+1) C$

- $(V_{x2} \emptyset_{x2} T_{(t2, \beta s, a2)} n_j \#_{y2}) : (1-1) > \odot$
 $\langle \text{dicen}, \pm_s V_i \emptyset_i T_{(pr, in, p)} 3 \#_p \rangle \odot$
 $\langle \text{que}, (\beta_s V_{x1} \emptyset_{x1} T_{(t1, m, a1)} n_i \#_{y1}) : (-1+1) C$
 $(V_{x2} \emptyset_{x2} T_{(t2, \beta s, a2)} n_j \#_{y2}) : (1-1) > \odot$
 $\langle \text{siento}, +_s V_i \emptyset_i T_{(pr, in, p)} 1 \#_s \rangle$
2. $\langle \text{aseguro}, -_s V_a \emptyset_a T_{(pr, in, p)} 1 \#_s \rangle \odot$
 $\langle \text{que}, (-_s V_a \emptyset_a T_{(pr, in, p)} 1 \#_s) : (-1+1)$
 $C(\pm_s V_i \emptyset_i T_{(pr, in, p)} 3 \#_p) : (1-1) > \odot$
 $\langle \text{dicen}, \pm_s V_i \emptyset_i T_{(pr, in, p)} 3 \#_p \rangle \odot$
 $\langle \text{que}, (\pm_s V_i \emptyset_i T_{(pr, in, p)} 3 \#_p) : (-1+1)$
 $C(+_s V_i \emptyset_i T_{(pr, in, p)} 1 \#_s) : (1-1) > \odot$
 $\langle \text{siento}, +_s V_i \emptyset_i T_{(pr, in, p)} 1 \#_s \rangle$ by applying VIR
everywhere in line 1.
3. $\langle \text{aseguro que}, (-_s V_a \emptyset_a T_{(pr, in, p)} 1 \#_s) C(\pm_s V_i \emptyset_i T_{(pr, in, p)} 3 \#_p) : (1-1) > \odot$
 $\langle \text{dicen}, \pm_s V_i \emptyset_i T_{(pr, in, p)} 3 \#_p \rangle \odot$
 $\langle \text{que}, (\pm_s V_i \emptyset_i T_{(pr, in, p)} 3 \#_p) : (-1+1)$
 $C(+_s V_i \emptyset_i T_{(pr, in, p)} 1 \#_s) : (1-1) > \odot$
 $\langle \text{siento}, +_s V_i \emptyset_i T_{(pr, in, p)} 1 \#_s \rangle$ by applying LCR to the
first two functions in line 2.
4. $\langle \text{aseguro que dicen}, (-_s V_a \emptyset_a T_{(pr, in, p)} 1 \#_s) C(\pm_s V_i \emptyset_i T_{(pr, in, p)} 3 \#_p) > \odot$
 $\langle \text{que}, (\pm_s V_i \emptyset_i T_{(pr, in, p)} 3 \#_p) : (-1+1)$
 $C(+_s V_i \emptyset_i T_{(pr, in, p)} 1 \#_s) : (1-1) > \odot$
 $\langle \text{siento}, +_s V_i \emptyset_i T_{(pr, in, p)} 1 \#_s \rangle$ by applying LCR to the
first two functions in line 3.
5. $\langle \text{aseguro que dicen}, (-_s V_a \emptyset_a T_{(pr, in, p)} 1 \#_s) C(\pm_s V_i \emptyset_i T_{(pr, in, p)} 3 \#_p) > \odot$
 $\langle \text{que siento}, (\pm_s V_i \emptyset_i T_{(pr, in, p)} 3 \#_p) : (-1+1)$
 $C(+_s V_i \emptyset_i T_{(pr, in, p)} 1 \#_s) >$ by applying LCR to the last
two functions in line 4.
6. $\langle \text{aseguro que dicen que siento}, (-_s V_a \emptyset_a T_{(pr, in, p)} 1 \#_s)$
 $C(\pm_s V_i \emptyset_i T_{(pr, in, p)} 3 \#_p) C(+_s V_i \emptyset_i T_{(pr, in, p)} 1 \#_s) >$
by applying LCR to the two functions in line 5.

As to the tense agreement between super- and sub-ordinate verb in a determiner clause, the Real Academia, for example,

summarizes the *concordantia temporum* in modern Spanish as follows:

"1st. Subordinated verb in indicative:

- a) Any tense can be used in the subordinate verb [...]
- b) Verbs of sensory perception (*ver* , *oir* , *mirar* , *escuchar* , etc.) must coexist with the subordinate verb, unless their main meaning is metaphorically altered [...]

2nd. Subordinate verb in subjunctive.

- a) With verbs of will (of command, request, desire, etc.), the subordinate verb can appear in any tense posterior to the main verb.
- b) With the rest of the verbs that govern subjunctive: If the subordinating [verb] is in present or future, the subordinate can appear in any tense [...]; on the other hand, with the main [verb] in the past, the subordinate should also go in the past (imperfect, perfect, or pluperfect) [...]" (1978:518-520)²⁷

According to the Academia, "the relations that matter in our case are those of coexistence, anteriority, and posteriority [...]" (1978:518). In order to incorporate tense agreement to our analysis, all we have to do is incorporate the relations of simultaneity (coexistence), anteriority, and posteriority between tenses into the specifications of *que* using the symbols "<", ">", and "=" and their disjunctive combinations "≤" and "≥" as follows

Definition 2:

- $=t_1 =_{\text{def}} t_2$, such that t_2 is simultaneous with t_1 ;
- $<t_1 =_{\text{def}} t_2$, such that t_2 is anterior to t_1 ;
- $>t_1 =_{\text{def}} t_2$, such that t_2 is posterior to t_1 ;
- $\leq t_1 =_{\text{def}} t_2$, such that t_2 is anterior to or simultaneous with t_1 ;

²⁷ For a more detailed summary see Fernández Alvarez (1984:128-129)

$\geq t_1 =_{\text{def}} t_2$, such that t_2 is posterior to or simultaneous with t_1 ;

where, unless otherwise indicated, t_1 and t_2 are the tenses of the super- and sub-ordinate verbs respectively.

So, if we wanted, for example to specify the *que* that takes so-called verbs of will (like, say *querer*) on the left, and specify the fact that in this case, as the Real Academia points out, "the subordinate verb can appear in any tense posterior to the main verb", all we have to do is re-specify *que* as follows:

$$\langle \text{que}, (\beta_s, V_{x1}, \emptyset_{x1}, T_{(t1, m, a1)}, n_{ij \neq i} \#_{y1}) : (-1+1) \\ C'(V_{x2}, \emptyset_{x2}, T_{(>t1, \beta_s, a2)}, n_{ij \neq i} \#_{y2}) : (1-1) \rangle,$$

which, as the reader will notice, has $>t1$, instead of $t2$, as the tense variable for the subordinate verb V_{x2} . This limits the possible tenses in the subordinate verb to only those which are posterior to the tense of the superordinate verb, correctly starrng the following as an ungrammatical tense for *comer* as the subordinate verb of the verb of will *quiero*:

*quiero que *comieras* 'I want you to eat (past subj.)'

leaving

quiero que √comas 'I want you to eat (pres. subj.)'

as the only possible tense for the subordinate verb of *quiero*.²⁸

²⁸ The only one possible tense, of course, given the fact that we are not dealing here with any of the compound tenses, in which case we would have had to provide for the grammaticality of *√quiero que hayas comido* 'I want you to have eaten'. This brings up the question of whether *vengas* 'you to come' and *hayas venido* 'you to have come' are anterior, simultaneous, or posterior to *quiero*. My answer is the same as Fernández Alvarez: "1. In the contemporary subjunctive only four tenses are used: present [*vengas*], present perfect [*hayas venido*], imperfect [*vinieras* 'you to come (past subj.)'], and pluperfect [*hubieras venido*]. 2. In today's Spanish the subordinate sentence the present subjunctive and the present perfect subjunctive assume the functions of the archaic future imperfect and future perfect, respectively." (1984:128) In other words, *vengas* and *hayas venido* are posterior to *quiero* because in the subjunctive they function as futures.

2. Adverbial clauses

In discussing adverbial clauses we can follow the same approach as with determiner clauses, we can also divide these clauses into three different groups, only now it is not the superordinate verb that will determine the mood and tense agreement but the conjunction, as we can see from the following paradigm:

cocino para que comamos 'I cook so that we eat'
*cocino para que *comemos*
cocino aunque comamos 'I cook even though we may eat'
cocino aunque comemos 'I cook even though we eat'
*cocino porque *comamos*
cocino porque comemos ²⁹'I cook because we eat'

So, what we have here are three different classes of conjunctions, which we can specify as follows:

$\langle \text{para que}, (V_{x1} \emptyset_{x1} T_{(t1, m, a1)} n_i \# y_1) : (-1+1) C$
 $(V_{x2} \emptyset_{x2} T_{(t2, s, a2)} n_j \# y_2) : (1-1) \rangle,^{30}$

$\langle \text{aunque}, (V_{x1} \emptyset_{x1} T_{(t1, m1, a1)} n_i \# y_1) : (-1+1) C$
 $(V_{x2} \emptyset_{x2} T_{(t2, m2, a2)} n_j \# y_2) : (1-1) \rangle,$

$\langle \text{porque}, (V_{x1} \emptyset_{x1} T_{(t1, m, a1)} n_i \# y_1) : (-1+1) C$

²⁹ The reader may want to be reminded here that there are two different *porque*s, one that translates as 'so that' (and which is in the same class as and is a rough synonym of *para que* and, therefore, only takes verbs in subjunctive to its right) and the one that translates as 'because' (and only takes verbs in indicative to its right).

³⁰ It should be pointed out that in the case of the function word *para que* the subjects of the superordinate and subordinate verbs cannot be coreferential. This is, beyond mood and tense, yet another form of agreement (or disagreement) that exists in compound sentences but which I will not be exploring in this work since it constitutes a whole separate topic in itself. This means our function word *para que* overgenerates sentences like the following:

**cocino para que (yo)coma*
**cocinas para que comas*
**(Rafael)cocina para que (Rafael)coma*, etc.

$$(V_{x2} \emptyset_{x2} T_{(t2,i,a2)} n_j \#_{y2}) : (1-1) >$$

And from the following paradigm we can start to figure out the type of relation that exists between t1 and t2:

*cocino para que *comiéramos* 'I cook so that we ate (subj.)'
cocino para que comamos
cocino aunque comiéramos
cocino aunque comamos
cocino aunque comimos/comíamos
cocino aunque comemos

cocino porque comemos
cocino porque comimos/comíamos.

As we can see the only class whose specification has to be restricted as to the relationship between the tenses is the class of *para que*, and we can do it as follows:

$$\begin{aligned} <\text{para que}, (V_{x1} \emptyset_{x1} T_{(t1,m,a1)} n_i \#_{y1}) : (-1+1) C \\ & (V_{x2} \emptyset_{x2} T_{(>t1,s,a2)} n_j \#_{y2}) : (1-1) >, \end{aligned}$$

which simply adds the specification that in verbs brought together by *para que* or any other member of its class the tense of the subordinate verb has to be posterior to the tense of the superordinate verb.³¹

If we consider the fact that there are hundreds ³² of conjunctions in Spanish, we could choose to avoid repeating the strings of categories

$$(V_{x1} \emptyset_{x1} T_{(t1,m,a1)} n_i \#_{y1}) : (-1+1) C$$

³¹ I should point out, first, that my Puerto Rican dialect and ultimately my idiolect are the criteria behind all grammaticality judgements here and throughout this work and, second, that the lexical grammar used here is, *mutatis mutandis*, flexible enough to model dialects and idiolects other than mine.

³² And thousands if we include what could be called **conjunction schemata** like *por más* + A + *que* (e.g. *por más listo que seas ...* 'no matter how smart you are...') *por más* + N + *que* (e.g. *por más libros que tengas...* 'no matter how many books you have...'), etc., of which there are as many as there are adjectives and nouns in Spanish.

$$\begin{aligned}
& (V_{x2} \emptyset_{x2} T_{(t2,s,a2)} n_j \# y_2)^{:(1-1)}, \\
& (V_{x1} \emptyset_{x1} T_{(t1,m1,a1)} n_i \# y_1)^{:(-1+1)} C \\
& (V_{x2} \emptyset_{x2} T_{(t2,m2,a2)} n_j \# y_2)^{:(1-1)}, \text{ and} \\
& (V_{x1} \emptyset_{x1} T_{(t1,m,a1)} n_i \# y_1)^{:(-1+1)} C \\
& (V_{x2} \emptyset_{x2} T_{(t2,i,a2)} n_j \# y_2)^{:(1-1)}
\end{aligned}$$

and simply mark each conjunction with the class it belongs to, say,

$$\begin{aligned}
& \langle \text{para que}, C_s \rangle \\
& \langle \text{aunque}, C_{\pm s} \rangle \\
& \langle \text{porque}, C_{-s} \rangle
\end{aligned}$$

and let them combine with

$$\begin{aligned}
& \langle \emptyset, C_s^{-1} (V_{x1} \emptyset_{x1} T_{(t1,m,a1)} n_i \# y_1)^{:(-1+1)} C_s \\
& (V_{x2} \emptyset_{x2} T_{(t2,s,a2)} n_j \# y_2)^{:(1-1)} \rangle, \\
& \langle \emptyset, C_{\pm s}^{-1} (V_{x1} \emptyset_{x1} T_{(t1,m1,a1)} n_i \# y_1)^{:(-1+1)} C_{\pm} \\
& (V_{x2} \emptyset_{x2} T_{(t2,m2,a2)} n_j \# y_2)^{:(1-1)} \rangle, \text{ and} \\
& \langle \emptyset, C_{-s}^{-1} (V_{x1} \emptyset_{x1} T_{(t1,m,a1)} n_i \# y_1)^{:(-1+1)} C_{-s} \\
& (V_{x2} \emptyset_{x2} T_{(t2,i,a2)} n_j \# y_2)^{:(1-1)} \rangle.
\end{aligned}$$

3. Adjectival clauses

We now turn our attention to adjectival clauses, of which, as we have done with determiner and adverbial clauses, we only treat a few significant classes to show how they can be accounted for in this lexical grammar. Consider the following paradigm:

- * *Tengo una amiga que cante.*
- Tengo una amiga que canta.*
- 'I have a friend who sings.'

No tengo ninguna amiga que cante.

'I don't have any friend who sings.'

* *No tengo ninguna amiga que canta.*

One conclusion we can draw from this pattern is that some adjective clauses go in subjunctive if the determiner of the determiner phrase they modify has some kind of negative feature, like the determiner *ninguna*. We can make this negative feature of *ninguna* explicit by specifying it in the same way as *una*

$\langle \text{una}, D_{\text{indef1}} 3G_f \#_s (NG_f \#_s) (NG_f \#_s)^{-1} \rangle$

but with a negation symbol

$\langle \text{ninguna}, D_{\text{-indef1}} 3G_f \#_s (NG_f \#_s) (NG_f \#_s)^{-1} \rangle$

then we can specify the adjectival conjunction *que* in such a way that it will bind a negative determiner with the subjunctive mood in the subordinate verb:

$\langle \text{que}, (D_{\beta-\partial} 3G_u \#_v (G_u \#_v))^{(-1+1)} C(V\emptyset T_{(t, \beta s, a)} 3 \#_v)^{(-1+1)} \rangle^{33}$,

where β is a variable ranging over + and -, and applying to ∂ , which in turn is a variable ranging over the possible determiner classes (i.e. def1, def2, ..., indef1, indef2, ...) whenever applicable.

³³ The fact that we have person and number agreement between the modified determiner phrase on the left and the subordinate verb on the right represented by the two 3's in the formula makes things look like we want to exclude composites like *tengo una amiga que [ustedes] conocen* 'I have a friend (fem) that you (pl) know', where *una amiga* is 3rd person singular and *conocen* is 2nd person plural. And the truth is we do want to exclude these phrases because they belong to a different species or at least a different subspecies. In this sentence *una amiga* is the direct object of *conocen*, whereas in *tengo una amiga que canta*, *una amiga* is not the direct object but the subject of *conocen*. actually the 'long form' of this phrase in Spanish is *tengo una amiga a la que [ustedes] conocen*.

V QUESTION -ANSWER AGREEMENT

1. Questions

Generating questions through lexical composition requires, among other things, that we generate sentences like

$\sqrt{\text{¿}} \text{Qué cocinas?}$ 'What do you cook?'
 $\sqrt{\text{¿}} \text{A quién le cocinas?}$ 'Who do you cook for?'
 $\sqrt{\text{¿}} \text{Para qué cocinas?}$ 'What do you cook for?'

while avoiding sentences like

$\ast \text{¿Qué cocinas una sopa?}$
 $\ast \text{¿A quién le cocinas a mi amiga?}$

even though there's nothing wrong with sentences like

$\sqrt{\text{cocinas una sopa}}$ 'you cook a soup'
 $\sqrt{\text{le cocinas a mi amiga}}$ 'you cook for my friend'

In other words, question words like *qué* and *a quién* compose with verbs that can perfectly take a direct object or an indirect object, or a *para qué* clause but in the case of *qué* and *a quién* the composition will take place only on the condition that the verbs do not actually take these verbal complements.

We seem to have a problem not at all dissimilar from the one we encountered while discussing direct object clitics, where we saw that these clitics were in complementary distribution with direct objects. We also saw how to specify a function word like *lo*,

$$\langle \text{lo}, O_{d/\text{pro}}(V_r \emptyset_s T_{(t,m,a)} n \#_z) O_d ((V_r \emptyset_s T_{(t,m,a)} n \#_z) O_d O_d^{-1})^{-1} \rangle,$$

to take a verb that has been transitivized for a direct object but has not taken it yet. The specification of *que*, for example, turns out to be, at least at this degree of detail and excepting its intrinsic category, the same as that of a direct object clitic, except for the fact that here we specify the mood of the verb it takes as

indicative³⁴ :

$$\langle \text{qué}, Q_{\text{DO}}(V_r \emptyset_s T_{(t, \text{in}, a)} n \#_z) O_d((V_r \emptyset_s T_{(t, \text{in}, a)} n \#_z) O_d O_d^{-1})^{-1} \rangle.$$

Let's derive *¿Qué cocinas?* :

1. $\langle \text{qué}, Q_{\text{DO}}(V_r \emptyset_s T_{(t, m, a)} n \#_z) O_d((V_r \emptyset_s T_{(t, m, a)} n \#_z) O_d O_d^{-1})^{-1} \rangle \odot$
 $\langle \text{cocinas}, V_a \emptyset_a T_{(pr, \text{in}, p)} 2s \rangle \odot$
 $\langle \emptyset, (V_r \emptyset_s T_{(t, m, a)} n \#_z) : (-1+1) O_d O_d^{-1} \rangle.$
2. $\langle \text{qué}, Q_{\text{DO}}(V_a \emptyset_a T_{(pr, \text{in}, p)} 2 \#_s) O_d((V_a \emptyset_a T_{(pr, \text{in}, p)} 2 \#_s) O_d O_d^{-1})^{-1} \rangle \odot$
 $\langle \text{cocinas}, V_a \emptyset_a T_{(pr, \text{in}, p)} 2 \#_s \rangle \odot$
 $\langle \emptyset, (V_a \emptyset_a T_{(pr, \text{in}, p)} 2 \#_s) : (-1+1) O_d O_d^{-1} \rangle$ by
 applying VIR everywhere in line 1.
3. $\langle \text{qué}, Q_{\text{DO}}(V_a \emptyset_a T_{(pr, \text{in}, p)} 2 \#_s) O_d((V_a \emptyset_a T_{(pr, \text{in}, p)} 2 \#_s) O_d O_d^{-1})^{-1} \rangle \odot$
 $\langle \text{cocinas}, (V_a \emptyset_a T_{(pr, \text{in}, p)} 2 \#_s) O_d O_d^{-1} \rangle$ by
 applying LCR in line 2.
4. $\langle \text{qué cocinas}, Q_{\text{DO}}(V_a \emptyset_a T_{(pr, \text{in}, p)} 2 \#_s) O_d \rangle$ by applying LCR in
 line 3.

The question word *a quién*, in turn, takes *le cocinas*, which should be, as the reader can confirm, the result, VIR application mediating, of the following lexical composition

³⁴ Specifying the verb as indicative excludes unwanted things like

- * *¿Qué cocines?*
- * *¿Qué cocinas?*

but it also excludes things that we would eventually like to generate, like

- ✓ *¿Qué cocinarías?* 'What would you cook?'
- ✓ *¿Qué habrías cocinado?* 'What would you have cooked?'
- ✓ *¿Qué hubieras cocinado?* 'What would you have cooked?'

Compound verbs, as we have mentioned before, have been left out of our analysis in order to simplify. The conditional, could be dealt with by including it as a possibility in the specification together with the indicative, or to simply specify the mood for -subjunctive (if we include the imperative also as some kind of subjunctive).

$\langle \text{le}, O_{i/\text{pro}} 3 \#_s (V_r \emptyset_s T_{(t,m,a)} n \#_z)^{(1-1)} \rangle \odot \langle \text{cocinas}, V_a \emptyset_a T_{(pr,in,p)} 2 \#_s \rangle,$

i.e.

$\langle \text{le cocinas}, O_{i/\text{pro}} 3 \#_s (V_a \emptyset_a T_{(pr,in,p)} 2 \#_s) \rangle.$

Therefore, we can specify *a quién* as follows:

$\langle a \text{ quién}, Q_{\text{IO}}$

$(O_{i/\text{pro}} 3 \#_s (V_r \emptyset_s T_{(t,in,a)} n \#_z)) O_i (O_{i/\text{pro}} 3 \#_s (V_r \emptyset_s T_{(t,in,a)} n \#_z))^{-1} \rangle,$

where the only indirect object clitic that *a quién* takes is the third person singular *le*:

- *¿A quién me cocinas?
- *¿A quién te cocinas?
- ✓¿A quién le cocinas?
- *¿A quién nos cocinas?
- *¿A quién os cocinas?
- *¿A quién les cocinas?³⁵.

And the mood of the verb is specified already as indicative.

So here's the full derivation of *¿A quién le cocinas?*:

1. $\langle a \text{ quién}, Q_{\text{IO}}$

³⁵ Analogously, *a quiénes* will only take 3rd person plural as can be seen in the following paradigm:

- *¿A quiénes me cocinas?
- *¿A quiénes te cocinas?
- *¿A quiénes le cocinas?
- *¿A quiénes nos cocinas?
- *¿A quiénes os cocinas?
- ✓¿A quiénes les cocinas? 'Who (pl.) do you cook for?'

It's specification would therefore be:

$\langle a \text{ quiénes}, Q_{\text{IO}}$

$(O_{i/\text{pro}} 3 \#_s (V_r \emptyset_s T_{(t,in,a)} n \#_z)) O_i (O_{i/\text{pro}} 3 \#_s (V_r \emptyset_s T_{(t,in,a)} n \#_z))^{-1} \rangle$

$$(O_{i/pro}3 \#_s(V_r \emptyset_s T_{(t,in,a)} n \#_z)) O_i(O_{i/pro}3 \#_s(V_r \emptyset_s T_{(t,in,a)} n \#_z))^{-1}) > \odot \\ <le, O_{i/pro}3 \#_s(V_r \emptyset_s T_{(t,m,a)} n \#_z):(1^{-1}) > \odot \\ <cocinas, V_a \emptyset_a T_{(pr,in,p)} 2 \#_s >$$

2. <a quién, Q_{iO}

$$(O_{i/pro}3 \#_s(V_a \emptyset_a T_{(pr,in,p)} 2 \#_s)) O_i(O_{i/pro}3 \#_s(V_a \emptyset_a T_{(pr,in,p)} 2 \#_s))^{-1}) > \odot \\ <le, O_{i/pro}3 \#_s(V_a \emptyset_a T_{(pr,in,p)} 2 \#_s):(1^{-1}) > \odot \\ <cocinas, V_a \emptyset_a T_{(pr,in,p)} 2 \#_s > \\ \text{by VIR applied everywhere in line 1.}$$

3. <a quién, Q_{iO}

$$(O_{i/pro}3 \#_s(V_a \emptyset_a T_{(pr,in,p)} 2 \#_s)) O_i(O_{i/pro}3 \#_s(V_a \emptyset_a T_{(pr,in,p)} 2 \#_s))^{-1}) > \odot \\ <le cocinas, O_{i/pro}3 \#_s(V_a \emptyset_a T_{(pr,in,p)} 2 \#_s) > \\ \text{by LCR applied to the last two function words in} \\ \text{line 2.}$$

4. <a quién le cocinas, $Q_{iO}(O_{i/pro}3 \#_s(V_a \emptyset_a T_{(pr,in,p)} 2 \#_s)) O_i >$
by LCR applied to line 3.

Finally, the question word *para qué* simply takes a verb, like *cocinas*, which means we can specify it for just that:

$$<para\ qué, Q_{pq}(V_r \emptyset_s T_{(t,in,a)} n \#_z):(1^{-1}) >$$

And the derivation of *¿Para qué cocinas?* would thus be:

1. <para qué, $Q_{pq}(V_r \emptyset_s T_{(t,in,a)} n \#_z):(1^{-1}) > \odot <cocinas, V_a \emptyset_a T_{(pr,in,p)} 2 \#_s >$.
2. <para qué, $Q_{pq}(V_a \emptyset_a T_{(pr,in,p)} 2 \#_s):(1^{-1}) > \odot <cocinas, V_a \emptyset_a T_{(pr,in,p)} 2 \#_s >$
by VIR applied to line 1.
3. <para qué cocinas, $Q_{pq}(V_a \emptyset_a T_{(pr,in,p)} 2 \#_s) >$
by LCR applied to line 2.

2. Question-answer agreement

Finally, within the context of the lexical grammar presented so far, I would like to explore the possibility of accounting for the agreement that exists between a question and some of its low marked possible answers.

Questions like the ones we considered in the previous section,

¿Qué cocinas?
¿A quién le cocinas?
¿Para qué cocinas?,

can be said to have sets of highly unmarked answers that correspond to them, for example,

Una sopa.
A mi amiga.
Para que comamos.

One way of expressing the relationship that exists between a question headed by the question word *¿Para qué ... ?* and its highly unmarked answer headed by the conjunction *Para que ...* is by including the head of the answer as an argument in the specification of the question word. So, given the original specification of *Para qué*, submitted in the previous section,

$$\langle \text{para qué}, Q_{pq}(V_r \emptyset_s T_{(t,m,a)} n \#_z)^{:(1-1)} \rangle$$

and given the specifications proposed in the section on adverbial clauses for *para que*,

$$\langle \text{para que}, C_s \rangle,$$

and for the function that transitivizes it,

$$\langle \emptyset, C_s^{-1}(V_{x1} \emptyset_{x1} T_{(t1,m,a1)} n_i \#_{y1})^{:(-1+1)} C_s \\ (V_{x2} \emptyset_{x2} T_{(t2,s,a2)} n_j \#_{y2})^{:(1-1)} \rangle,$$

we can combine the three to express this particular case of question- answer (or question-response, Q-R) agreement:

$$\langle \text{para qué}, Q_{pq}$$

$$((V_{x1} \emptyset_{x1} T_{(t1, in, a1)} n_i \#_{y1}) C_{pq} (V_{x2} \emptyset_{x2} T_{(>t1, s, a2)} n_j \#_{y2})) : (1-1) >^{36}$$

As the reader will notice, even though the verb in the answer, following *para que* still goes in subjunctive,

$$V_{x2} \emptyset_{x2} T_{(>t1, s, a2)} n_j \#_{y2} ,$$

in the question the mood of the verb cannot go in subjunctive,

$$V_{x1} \emptyset_{x1} T_{(t1, in, a1)} n_i \#_{y1} .$$

In the rest of this section, since we are assuming that a question headed by *para qué* is specifically mapping an answer headed by *para que* and not just any conjunction in the family of the C_s conjunctions, we will --for the purposes of this chapter-- respecify *para que* as

$$\langle \text{para que}, C_{pq} \rangle .$$

Let's derive the question-answer ¿*Para qué cocinas?* *Para que comas.* :

1. $\langle \text{para qué}, Q_{pq} \rangle$

$$\begin{aligned} & ((V_{x1} \emptyset_{x1} T_{(t1, in, a1)} n_i \#_{y1}) C_{pq} (V_{x2} \emptyset_{x2} T_{(>t1, s, a2)} n_j \#_{y2})) : (1-1) > \odot \\ & \quad \langle \text{cocinas}, V_a \emptyset_a T_{(pr, in, p)} 2 \#_s \rangle \odot \\ & \quad \langle \text{para que}, C_{pq} \rangle \odot \\ & \quad \langle \text{comas}, V_e \emptyset_e T_{(pr, s, p)} 2 \#_s \rangle . \end{aligned}$$

2. $\langle \text{para qué}, Q_{pq} \rangle$

$$((V_a \emptyset_a T_{(pr, in, p)} 2 \#_s) C_{pq} (V_e \emptyset_e T_{(pr, s, p)} 2 \#_s)) : (1-1) > \odot$$

³⁶ Here, as in section 2 of chapter IV, I do not consider the problem of coreferentiality. We, therefore, generate question-answers with a dubious grammaticality status:

Q1: ¿ <i>Para qué cocino?</i>	A1: ? <i>Para que comas.</i>
Q2: ¿ <i>Para qué cocinas?</i>	A2: ? <i>Para que (yo) coma.</i>
Q3: ¿ <i>Para qué cocina (ella_i) ?</i>	A3: ? <i>Para que (ella_i) coma.,</i>

etc.

$\langle \text{cocinas}, V_a \emptyset_a T_{(pr, in, p)} 2 \#_s \rangle \odot$
 $\langle \text{para que}, C_{pq} \rangle \odot$
 $\langle \text{comas}, V_e \emptyset_e T_{(pr, s, p)} 2 \#_s \rangle$ by VIR applied
 everywhere in line 1.

3. $\langle \text{para qué}, Q_{pq} \rangle$
 $((V_a \emptyset_a T_{(pr, in, p)} 2 \#_s) C_{pq} (V_e \emptyset_e T_{(pr, s, p)} 2 \#_s))$
 $((V_a \emptyset_a T_{(pr, in, p)} 2 \#_s) C_{pq} (V_e \emptyset_e T_{(pr, s, p)} 2 \#_s))^{-1} \odot$
 $\langle \text{cocinas}, V_a \emptyset_a T_{(pr, in, p)} 2 \#_s \rangle \odot$
 $\langle \text{para que}, C_{pq} \rangle \odot$
 $\langle \text{comas}, V_e \emptyset_e T_{(pr, s, p)} 2 \#_s \rangle$ by Def.1 applied to the
 first function word in line 2.

4. $\langle \text{para qué}, Q_{pq} \rangle$
 $((V_a \emptyset_a T_{(pr, in, p)} 2 \#_s) C_{pq} (V_e \emptyset_e T_{(pr, s, p)} 2 \#_s))$
 $(V_e \emptyset_e T_{(pr, s, p)} 2 \#_s)^{-1} C_{pq}^{-1} (V_a \emptyset_a T_{(pr, in, p)} 2 \#_s)^{-1} \odot$
 $\langle \text{cocinas}, V_a \emptyset_a T_{(pr, in, p)} 2 \#_s \rangle \odot$
 $\langle \text{para que}, C_{pq} \rangle \odot$
 $\langle \text{comas}, V_e \emptyset_e T_{(pr, s, p)} 2 \#_s \rangle$ by SASI applied to the
 first function word in line 3.

5. $\langle \text{para qué cocinas}, Q_{pq} \rangle$
 $((V_a \emptyset_a T_{(pr, in, p)} 2 \#_s) C_{pq} (V_e \emptyset_e T_{(pr, s, p)} 2 \#_s))$
 $(V_e \emptyset_e T_{(pr, s, p)} 2 \#_s)^{-1} C_{pq}^{-1} \odot$
 $\langle \text{para que}, C_{pq} \rangle \odot$
 $\langle \text{comas}, V_e \emptyset_e T_{(pr, s, p)} 2 \#_s \rangle$ by LCR applied to the
 first two function words in line 4.

6. $\langle \text{para qué cocinas para que}, Q_{pq} \rangle$
 $((V_a \emptyset_a T_{(pr, in, p)} 2 \#_s) C_{pq} (V_e \emptyset_e T_{(pr, s, p)} 2 \#_s))$
 $(V_e \emptyset_e T_{(pr, s, p)} 2 \#_s)^{-1} \odot$
 $\langle \text{comas}, V_e \emptyset_e T_{(pr, s, p)} 2 \#_s \rangle$ by LCR applied to the
 first two function words in line 5.

7. $\langle \text{para qué cocinas para que comas}, Q_{pq} \rangle$
 $(V_a \emptyset_a T_{(pr, in, p)} 2 \#_s) C_{pq} (V_e \emptyset_e T_{(pr, s, p)} 2 \#_s)$
 by LCR applied to the first two function words in
 line 6.

The relationship that exists between a question headed by the

question word *¿A quién ...?* and its highly unmarked answer headed by the indirect object marker *A ...* can be expressed, as in the case just treated, by including the head of the answer as an argument in the specification of the question word. So, given the original specification of *A quién*, submitted in the previous section,

$\langle a \text{ quién}, Q_O$

$(O_{i/pro} 3 \#_s (V_r \emptyset_s T_{(t,in,a)} n \#_z)) O_i (O_{i/pro} 3 \#_s (V_r \emptyset_s T_{(t,in,a)} n \#_z))^{-1} \rangle,$

and the specification of the indirect object marker in Chapter III, section 5,

$\langle a, O_i (D_x n G_y \#_z N_p G_y \#_z) : (1-1) \rangle,$

we can combine them to respecify the question function word *a quién* in such a way that it will also map an answer headed by the indirect object marker:

$\langle a \text{ quién}, Q_O ((O_{i/pro} 3 \#_s) (V_r \emptyset_s T_{(t,in,a)} n \#_z) O_i) : (1-1) \rangle.$

Let's derive the question-answer *¿A quién le cocinas? A mi amiga.* :

1. $\langle a \text{ quién}, Q_O ((O_{i/pro} 3 \#_s) (V_r \emptyset_s T_{(t,in,a)} n \#_z) O_i) : (1-1) \rangle \odot$

$\langle le, O_{i/pro} 3 \#_s (V_r \emptyset_s T_{(t,m,a)} n \#_z) : (1-1) \rangle \odot$

$\langle cocinas, V_a \emptyset_a T_{(pr,in,p)} 2 \#_s \rangle \odot$

$\langle a, O_i (D_x n G_y \#_z N_p G_y \#_z) : (1-1) \rangle \odot$

$\langle mi, D_{poss1ss} 3 G_x \#_s (N G_x \#_s) (N G_x \#_s)^{-1} \rangle \odot$

$\langle amiga, N_p G \#_s \rangle.$

2. $\langle a \text{ quién}, Q_O ((O_{i/pro} 3 \#_s) (V_a \emptyset_a T_{(pr,in,p)} 2 \#_s) O_i) : (1-1) \rangle \odot$

$\langle le, O_{i/pro} 3 \#_s (V_a \emptyset_a T_{(pr,in,p)} 2 \#_s) : (1-1) \rangle \odot$

$\langle cocinas, V_a \emptyset_a T_{(pr,in,p)} 2 \#_s \rangle \odot$

$\langle a, O_i (D_{poss1ss} 3 G_f \#_s N_p G \#_s) : (1-1) \rangle \odot$

$\langle mi, D_{poss1ss} 3 G_f \#_s (N_p G \#_s) (N_p G \#_s)^{-1} \rangle \odot$

$\langle amiga, N_p G \#_s \rangle$ by VIR applied everywhere in line 1.

3. $\langle a \text{ quién}, Q_O((O_{i/pro} 3 \#_s)(V_a \emptyset_a T_{(pr,in,p)} 2 \#_s) O_i)^{(1-1)} \rangle \odot$
 $\langle le, O_{i/pro} 3 \#_s (V_a \emptyset_a T_{(pr,in,p)} 2 \#_s)^{(1-1)} \rangle \odot$
 $\langle cocinas, V_a \emptyset_a T_{(pr,in,p)} 2 \#_s \rangle \odot$
 $\langle a, O_i(D_{poss1ss} 3G_f \#_s N_p G \#_s)^{(1-1)} \rangle \odot$
 $\langle mi \text{ amiga}, D_{poss1ss} 3G_f \#_s (N_p G \#_s) \rangle$
 by LCR applied to the last two pairs in line 2.
4. $\langle a \text{ quién}, Q_O((O_{i/pro} 3 \#_s)(V_a \emptyset_a T_{(pr,in,p)} 2 \#_s) O_i)^{(1-1)} \rangle \odot$
 $\langle le, O_{i/pro} 3 \#_s (V_a \emptyset_a T_{(pr,in,p)} 2 \#_s)^{(1-1)} \rangle \odot$
 $\langle cocinas, V_a \emptyset_a T_{(pr,in,p)} 2 \#_s \rangle \odot$
 $\langle a \text{ mi amiga}, O_i(D_{poss1ss} 3G_f \#_s N_p G \#_s) \rangle$
 by LCR applied to the last two pairs in line 3.
5. $\langle a \text{ quién}, Q_O((O_{i/pro} 3 \#_s)(V_a \emptyset_a T_{(pr,in,p)} 2 \#_s) O_i)^{(1-1)} \rangle \odot$
 $\langle le \text{ cocinas}, O_{i/pro} 3 \#_s (V_a \emptyset_a T_{(pr,in,p)} 2 \#_s) \rangle \odot$
 $\langle a \text{ mi amiga}, O_i(D_{poss1ss} 3G_f \#_s N_p G \#_s) \rangle$
 by LCR applied to the 2nd and 3rd pairs in line 4.
6. $\langle a \text{ quién}, Q_O((O_{i/pro} 3 \#_s)(V_a \emptyset_a T_{(pr,in,p)} 2 \#_s) O_i)$
 $((O_{i/pro} 3 \#_s)(V_a \emptyset_a T_{(pr,in,p)} 2 \#_s) O_i)^{-1} \rangle \odot$
 $\langle le \text{ cocinas}, O_{i/pro} 3 \#_s (V_a \emptyset_a T_{(pr,in,p)} 2 \#_s) \rangle \odot$
 $\langle a \text{ mi amiga}, O_i(D_{poss1ss} 3G_f \#_s N_p G \#_s) \rangle$
 by Def.1 applied to the 1st pair in line 5.
7. $\langle a \text{ quién}, Q_O((O_{i/pro} 3 \#_s)(V_a \emptyset_a T_{(pr,in,p)} 2 \#_s) O_i)$
 $Q_i^{-1}((O_{i/pro} 3 \#_s)(V_a \emptyset_a T_{(pr,in,p)} 2 \#_s))^{-1} \rangle \odot$
 $\langle le \text{ cocinas}, O_{i/pro} 3 \#_s (V_a \emptyset_a T_{(pr,in,p)} 2 \#_s) \rangle \odot$
 $\langle a \text{ mi amiga}, O_i(D_{poss1ss} 3G_f \#_s N_p G \#_s) \rangle$
 by SASI applied to the 1st pair in line 6.
8. $\langle a \text{ quién le cocinas}, Q_O((O_{i/pro} 3 \#_s)(V_a \emptyset_a T_{(pr,in,p)} 2 \#_s) O_i) O_i^{-1} \rangle \odot$
 $\langle a \text{ mi amiga}, O_i(D_{poss1ss} 3G_f \#_s N_p G \#_s) \rangle$
 by LCR applied to the first two pairs in line 7.
9. $\langle a \text{ quién le cocinas a mi amiga},$
 $Q_O(O_{i/pro} 3 \#_s)(V_a \emptyset_a T_{(pr,in,p)} 2 \#_s) O_i \rangle$
 by LCR applied to the two pairs in line 8.

When we look at the categories in line 9 of this derivation, we can notice that, even though the sequence corresponds to the

orthographic words, there is nothing indicating that O_i is the head of the answer to the question headed by Q_{IO} , as opposed to being the indirect object of the verb $V_a \emptyset_a T_{(pr, in, p)} 2 \#_s$. To remedy this, we can include a category R to mark the beginning of an answer.³⁷ Using this R we can respecify *¿A quién ...?* as follows:

$$\langle a \text{ quién}, Q_{IO}((O_{i/pro} 3 \#_s)(V_r \emptyset_s T_{(t, in, a)} n \#_z) RO_i)) \\ ((O_{i/pro} 3 \#_s)(V_r \emptyset_s T_{(t, in, a)} n \#_z) O_i)^{-1} \rangle.$$

And we can do the same with *¿Para qué ...?*:

$$\langle para \text{ qué}, Q_{pq}((V_{x1} \emptyset_{x1} T_{(t1, in, a1)} n_{i\#} y_1) RC_{pq}(V_{x2} \emptyset_{x2} T_{(>t1, s, a2)} n_{j\#} y_2)) \\ ((V_{x1} \emptyset_{x1} T_{(t1, in, a1)} n_{i\#} y_1) C_{pq}(V_{x2} \emptyset_{x2} T_{(>t1, s, a2)} n_{j\#} y_2))^{-1} \rangle.$$

Finally, we turn to the specification of question-answers headed by the question function word *qué*, as in *¿Qué cocinas? Una sopa*. Given the specification of *qué*,

$$\langle qué, Q_{DO}(V_r \emptyset_s T_{(t, in, a)} n \#_z) O_d((V_r \emptyset_s T_{(t, in, a)} n \#_z) O_d O_d^{-1})^{-1} \rangle$$

and assuming that the answer will be headed by a determiner that has been marked as a direct object, we can respecify *qué* to include the direct object marker as one of its arguments:

$$\langle qué, Q_{DO}(V_r \emptyset_s T_{(t, in, a)} n \#_z) O_d FO_d((V_r \emptyset_s T_{(t, in, a)} n \#_z) O_d O_d^{-1} O_d)^{-1} \rangle.$$

This time we have included the answer category R right from the start.

Let's derive *¿Qué cocinas? Una sopa* :

1. *qué*,

$$Q_{DO}(V_r \emptyset_s T_{(t, in, a)} n \#_z) O_d FO_d O_d^{-1}((V_r \emptyset_s T_{(t, in, a)} n \#_z) O_d O_d^{-1})^{-1} \rangle \odot \\ \langle cocinas, V_a \emptyset_a T_{(pr, in, p)} 2 \#_s \rangle \odot \\ \langle una, D_{indef} 3 G_f \#_s (N_p G_f \#_s) (N_p G_f \#_s)^{-1} \rangle \odot$$

³⁷ We use R (evoking *respuesta* Sp. 'answer') instead of the obvious A because we have already used A for adjectives.

<sopa,NG_f#_s>.

2. <qué,

$Q_{\text{do}}(V_a \emptyset_a T_{(\text{pr}, \text{in}, \text{p})} 2 \#_s) O_d F O_d O_d^{-1} ((V_a \emptyset_a T_{(\text{pr}, \text{in}, \text{p})} 2 \#_s) O_d O_d^{-1})^{-1} > \odot$
 <cocinas, $V_a \emptyset_a T_{(\text{pr}, \text{in}, \text{p})} 2 \#_s > \odot$
 < $\emptyset, (V_a \emptyset_a T_{(\text{pr}, \text{in}, \text{p})} 2 \#_s) : (-1+1) O_d O_d^{-1} > \odot$
 < $\emptyset, O_d (D_{\text{indef}} 3G_f \#_s N_p G_f \#_s) : (1-1) > \odot$
 <una, $D_{\text{indef}} 3G_f \#_s (N_p G_f \#_s) (N_p G_f \#_s)^{-1} > \odot$
 <sopa,NG_f#_s> by VIR applied everywhere in line 1.

3. <qué,

$Q_{\text{do}}(V_a \emptyset_a T_{(\text{pr}, \text{in}, \text{p})} 2 \#_s) O_d F O_d O_d^{-1} ((V_a \emptyset_a T_{(\text{pr}, \text{in}, \text{p})} 2 \#_s) O_d O_d^{-1})^{-1} > \odot$
 <cocinas, $V_a \emptyset_a T_{(\text{pr}, \text{in}, \text{p})} 2 \#_s > \odot$
 < $\emptyset, (V_a \emptyset_a T_{(\text{pr}, \text{in}, \text{p})} 2 \#_s) : (-1+1) O_d O_d^{-1} > \odot$
 < $\emptyset, O_d (D_{\text{indef}} 3G_f \#_s N_p G_f \#_s) : (1-1) > \odot$
 <una sopa, $D_{\text{indef}} 3G_f \#_s (N_p G_f \#_s) >$
 by LCR applied to the last two function words in line 2.

4. <qué,

$Q_{\text{do}}(V_a \emptyset_a T_{(\text{pr}, \text{in}, \text{p})} 2 \#_s) O_d F O_d O_d^{-1} ((V_a \emptyset_a T_{(\text{pr}, \text{in}, \text{p})} 2 \#_s) O_d O_d^{-1})^{-1} > \odot$
 <cocinas, $V_a \emptyset_a T_{(\text{pr}, \text{in}, \text{p})} 2 \#_s > \odot$
 < $\emptyset, (V_a \emptyset_a T_{(\text{pr}, \text{in}, \text{p})} 2 \#_s) : (-1+1) O_d O_d^{-1} > \odot$
 <una sopa, $O_d (D_{\text{indef}} 3G_f \#_s N_p G_f \#_s) >$
 by LCR applied to the last two function words in line 3.

5. <qué,

$Q_{\text{do}}(V_a \emptyset_a T_{(\text{pr}, \text{in}, \text{p})} 2 \#_s) O_d F O_d O_d^{-1} ((V_a \emptyset_a T_{(\text{pr}, \text{in}, \text{p})} 2 \#_s) O_d O_d^{-1})^{-1} > \odot$
 <cocinas, $V_a \emptyset_a T_{(\text{pr}, \text{in}, \text{p})} 2 \#_s O_d O_d^{-1} > \odot$
 <una sopa, $O_d (D_{\text{indef}} 3G_f \#_s N_p G_f \#_s) >$
 by LCR applied to the 2nd and 3rd function words in line 4.

6. <qué cocinas, $Q_{\text{do}}(V_a \emptyset_a T_{(\text{pr}, \text{in}, \text{p})} 2 \#_s) O_d F O_d O_d^{-1} > \odot$

<una sopa, $O_d (D_{\text{indef}} 3G_f \#_s N_p G_f \#_s) >$

by LCR applied to the first two function words in line 5.

7. <qué cocinas una sopa, $Q_{\text{do}}(V_a \emptyset_a T_{(\text{pr}, \text{in}, \text{p})} 2 \#_s) O_d F O_d$

by LCR applied to line 6.

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Curriculum Vitae

Rafael Escribano-Díaz

(b. 1960, Valley Forge, Pennsylvania)

EDUCATION

- | | |
|---------|---|
| 1971-76 | High School, Colegio San Ignacio de Loyola
(Río Piedras, Puerto Rico) |
| 1976-81 | B.S. in Mathematics (Minor in Linguistics),
University of Puerto Rico. |
| 1984-85 | M.A. in Hispanic Civilization, New York
University in Madrid (Instituto Internacional).
Thesis on problems in English/Spanish
translation. |
| 1986-90 | Ph.D. (June 1990) in Romance Linguistics,
Department of Romance Languages, University
of Washington. |

PUBLICATIONS

Non-fiction:

La cuestión nacional: el Partido Nacionalista y el movimiento obrero puertorriqueño (written in collaboration with the Taller de Formación Política) (Ediciones Huracán, Puerto Rico, 1982).

Huelga en la caña!: 1933-1934 (written in collaboration with the Taller de Formación Política) (Ediciones Huracán, Puerto Rico, 1982).

Fiction:

Ya vendrán otros entierros (In collaboration with Robert Collins) (Iván El Terrible Filmscripts Inc., Puerto Rico, 1986).

Vol de Nit: novela bonsai en castellano como segunda

lengua (co-author: Antonio Bou) (Comunicación Limitada, Barcelona, 1984).

Music:

Human Rights (In collaboration with The Ganja Farmers. Recorded and mixed at Reciprocal Recording, Seattle, 1990.)

MAJOR TRANSLATIONS

Manual de instrucciones para RM571-GF: sistema de empaque al vacío (Trigon Corp., Seattle, 1989).

La carrera de Trotsky (from the American spy novel by Richard Hoyt --part of M.A. thesis, 1985).

Guía del inquilino para la corte de vivienda (In collaboration with Nannette Rosa-Collazo for Brooklyn Legal Services Inc., 1983).